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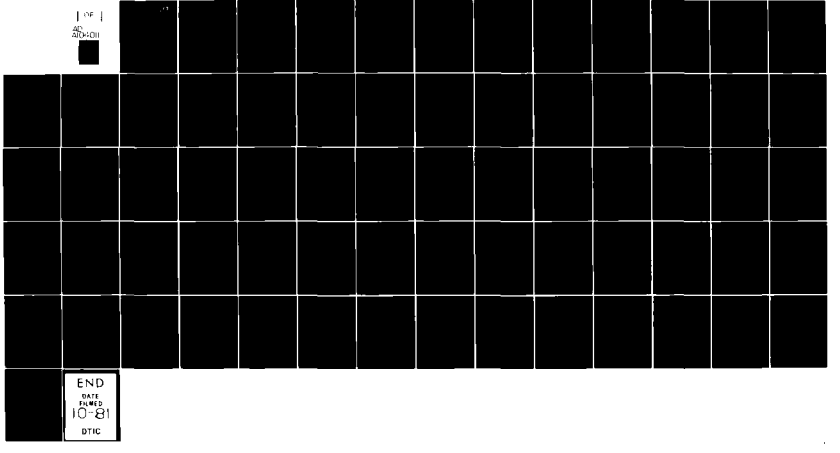

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MANAGEMENT REVIEW OF THE NAVY AVIATION SUPPORT EQUIPMENT PROGRAM

April 1981

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EXECUTIVE SUMMARY

Naval aircraft require a wide variety of ground support equipment to perform various functions: handling, servicing, starting, testing, adjusting, fault isolating, etc. Support equipment program fiscal requirements for development and procurement have been increasing and are estimated to be $769 million for FY 82 and $846 million for FY 83. This represents an increase of 44 percent over prior years' funding. The most notable increase is in Peculiar Support Equipment (PSE).

The Chief of Naval Operations has expressed concern about these growing ownership costs and requested the Chief of Naval Material to coordinate a review of the Aviation Ground Support Equipment Program. Logistics Management Institute was asked to conduct the review and to examine the procedures used by the Navy to establish research, development, and procurement requirements for Aviation Ground Support Equipment.

The Navy's organizational structure for establishing support equipment requirements is good. The Naval Air Systems Command (NAVAIR) has primary responsibility for acquisition and procurement of all support equipment. Since 1969, the Support Equipment Division (AIR-552), under the Assistant Commander for Systems and Engineering (AIR-05), has been chartered as Program Manager for Support Equipment. AIR-552 receives support from various field activities and works closely with other NAVAIR offices responsible for research and logistics support. AIR-552 supports the aircraft Project Manager (PMA) by validating and approving support equipment requirements. Support equipment management functions within NAVAIR are performed within a matrix organization, which assigns coordination and review responsibilities among various line functional offices.

There are two types of support equipment: peculiar support equipment (PSE), which supports only one type of aircraft, and common support equipment (CSE), which supports two or more different types of aircraft. This results in different management procedures and funding for the two types of support equipment.

The management procedures for identifying PSE requirements are sound. Normally, the weapon system contractor identifies the need for PSE, and the Navy reviews the contractor's recommendation to verify that the requirement can only be met by PSE. However, the procedures are invoked late in the weapons system acquisition process. Usually, support equipment requirements are formally identified during full-scale development of the aircraft. Because of time constraints, many support requirements must be met by PSE, thus impeding NAVAIR's goal of increased standardization. While contractors are required to consider the capabilities of existing CSE or PSE for application to a new aircraft system, there is no contractual incentive to minimize PSE requirements.

The management procedures for identifying CSE requirements and planning for CSE development and acquisition are for the most part excellent. Automatic test equipment (ATE), while considered CSE, is much more sensitive to weapon and avionic system design parameters than CSE in the other commodity areas. NAVAIR has imposed special restrictions on development of new ATE in order to encourage standardization.

Even though the management organization and procedures for establishing research, development and procurement requirements are sound, they could be strengthened by expanding the use of those CSE planning and review processes which already have demonstrated their value: Support Equipment Selection Analysis, the Ground Support Equipment Acquisition Review Board and the Program Element Master Plan.

Earlier consideration of support equipment requirements, commencing in the conceptual phase of aircraft acquisition, would enhance standardization. The present procedures do not encourage a close integration of supportability and operational design criteria at a time when design trade-offs are feasible. Earlier formal consideration of support equipment requirements could facilitate modification of weapon system design, modification of existing CSE, or development of new CSE. NAVAIR also should consider using contractual incentives to encourage a more widespread use of CSE.

More intensive management by the NAVAIR support equipment organization, already basically sound, is not the solution to the PSE proliferation problem. The problems associated with designing supportability into weapon systems should be addressed. Support equipment requirements should be more closely integrated into the entire development and acquisition process.

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1. INTRODUCTION

On November 8, 1980, a briefing was presented to the Chief of Naval Operations (CNO) on the status of the aviation support equipment[1] program. The CNO expressed concern about the growth in aircraft ownership costs and suggested a need to have programs which contribute to these growth costs reviewed to ensure effective program managements. He subsequently requested the Chief of Naval Material to coordinate a management review of the program. LMI was selected to perform the review.

LMI was tasked to examine the procedures used to establish research and development (R&D) and procurement requirements for aviation support equipment. A copy of the task order is at Appendix A. Excluded from the study were training equipment, spare parts, overhaul, calibration, and non-Navy requirements, such as Foreign Military Sales.

The review commenced on February 2, 1981 and was scheduled to be completed by March 31, 1981. The completion date was subsequently changed to April 6, 1981. The review included visits to Naval Air Systems Command (NAVAIR) headquarters components involved in the support equipment program (AIR-552, AIR-417, AIR-340) and the Naval Air Engineering Center, Lakehurst, New Jersey (NAEC). In addition, the F-14/PHEONIX Project Manager (PMA 241)

[1]Support equipment is all the equipment required on the ground to make a weapon system, command and control system, support system, subsystem, or item of support equipment operational in its intended environment. This includes all equipment required to install, launch, arrest (except shipboard and shore-based launching and arresting equipment), guide, control, direct, inspect, test, adjust, calibrate, appraise, gauge, measure, assemble, disassemble, handle, transport, safeguard, store, actuate, service, repair, overhaul, maintain, or operate the system, subsystem, and item or component. Support equipment is categorized as common or general purpose (CSE) and peculiar or special purpose (PSE).

was consulted. The review covered the identification of support equipment requirements, selection of equipment, management of the RDT&E process, and the preparation of Program Objective Memorandum (POM) and budget estimates. The following specific programs and processes were included:

- Ground Support Equipment Acquisition Review Board (GSEARB)
- Budget, Funding, Procurement Review Board (BFPRB)
- Program Element Master Plans (PEMP)
- Automatic Test Equipment (ATE) Program Plan
- Support Equipment Recommendation Data (SERD) Process
- Aircraft Maintenance Material Readiness List (AMMRL) Program
- Support Equipment Selection Analysis (SESA)
- POM/Budget Process

The study methodology was to identify the management organization and procedures, evaluate the soundness of and adherence to established procedures, and evaluate the requirements determination methodology, timeliness and cost trade-off considerations for R&D and acquisition. Selected programs were tracked through the development process: Jet Air Start Units, the TF41 TLA/TRIM Test Set (A/E 24M-30), and the Consolidated Support System (CSS).

This report consists of chapters on the three major areas of review: organization, development, and requirements identification. The final chapter summarizes the conclusions reached in each of the major areas.

2. NAVAIR ORGANIZATION FOR SUPPORT EQUIPMENT

INTRODUCTION

Each type of naval aircraft requires a variety of support equipment to perform many different functions, such as aircraft handling, servicing, starting, testing, inspecting, adjusting, etc. During aircraft design and development, the support equipment requirements must be determined and evaluated, so that procurement and deployment of both the aircraft and support equipment may proceed in a timely manner.

There are two basic types of support equipment: peculiar support equipment (PSE), designed to support just one specific type of aircraft (e.g., the F-14), and common support equipment (CSE), designed to support multiple types of aircraft. This difference dictates different management procedures, relationships, and funding.

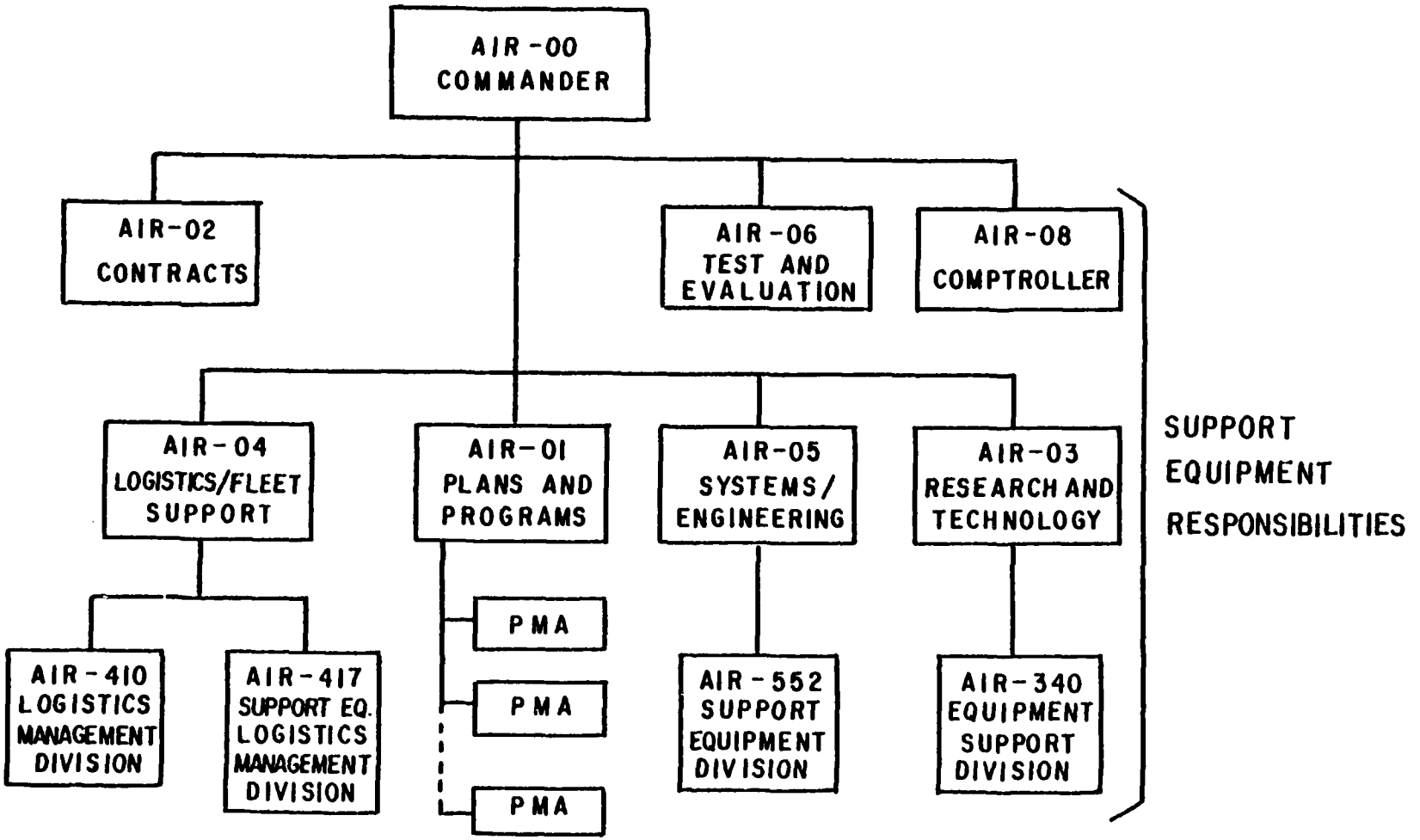
The research, development, acquisition, and procurement of both PSE and CSE is the responsibility of the Commander, Naval Air Systems Command, executed by various functional offices within NAVAIR headquarters and by various field activities.

FUNCTIONAL AND MATRIX ORGANIZATION

Figure 2-1 shows the basic NAVAIR headquarters line organization and identifies those functional offices having major responsibility for development and acquisition of support equipment. On this framework, NAVAIR has superimposed a matrix of project/program responsibilities and relationships designed to foster a teamwork approach to development of aviation weapon systems and equipment.

FIGURE 2-1

NAVAIR HEADQUARTERS ORGANIZATION FOR SUPPORT EQUIPMENT



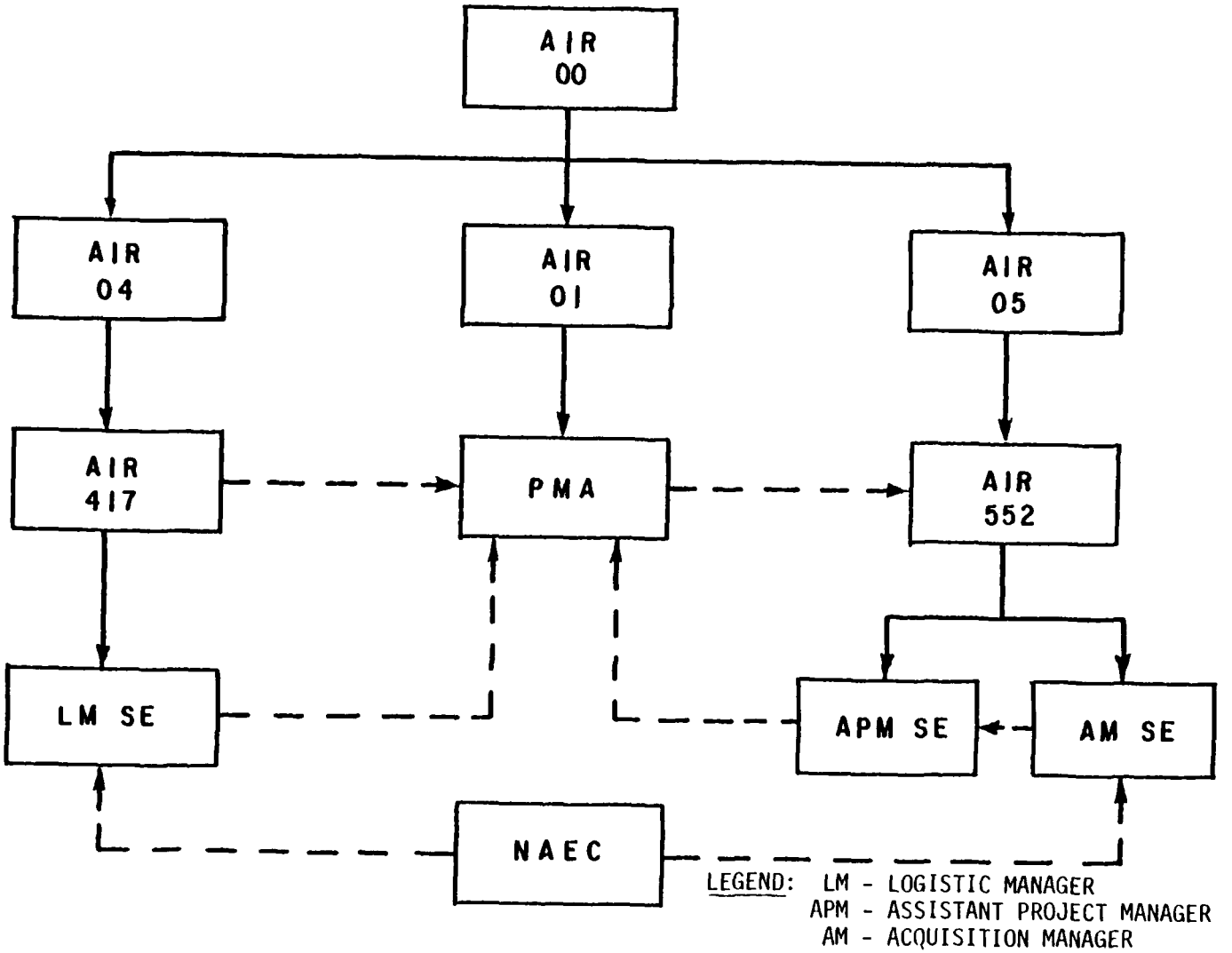
This matrix concept assigns specific project/program responsibility for an aircraft or weapon system to a single office, the NAVAIR Project Manager (PMA). Figure 2-2 shows the matrix of project responsibility. The PMA is responsible for the overall direction, control, and integration of all elements which contribute to the development, acquisition, procurement, production, and fleet introduction of a new aircraft or weapon system. The PMA is supported by other functional offices under the Assistant Commanders for Logistics/Fleet Support (AIR-04) and Systems and Engineering (AIR-05), in accordance with their specific responsibilities. The Director of the Support Equipment Logistics Management Division (AIR-417) designates a Logistics Manager for Support Equipment to report directly to the PMA on all support equipment logistics matters. Likewise, the Director of the Support Equipment Division (AIR-552) designates an Assistant Program Manager for Support Equipment. The Assistant Program Manager for Support Equipment is supported by AIR-552-designated Acquisition Managers responsible for the acquisition of all support equipment in a specific commodity area. Depending on the degree of commonality of the support equipment, the Acquisition Managers may support several Assistant Program Managers for Support Equipment.

One benefit of this organizational concept is that the PMA may draw directly upon the expertise and experience of personnel from the appropriate functional offices. Another benefit is that support to the PMA is provided by offices with a long-term interest and responsibility for support equipment which does not terminate with equipment acquisition.

Since 1969, AIR-552 has been chartered as the Program Manager for Support Equipment, with the same authority and responsibility for support equipment as the PMA has for his aircraft/weapon system. The PMA provides the necessary information to enable the Program Manager for Support Equipment to plan for

FIGURE 2-2

SUPPORT EQUIPMENT PROGRAM RELATIONSHIPS



the procurement and delivery of CSE. A NAVAIR field activity, the Naval Air Engineering Center (NAEC), supports both the Logistics Manager and the Assistant Program Manager.

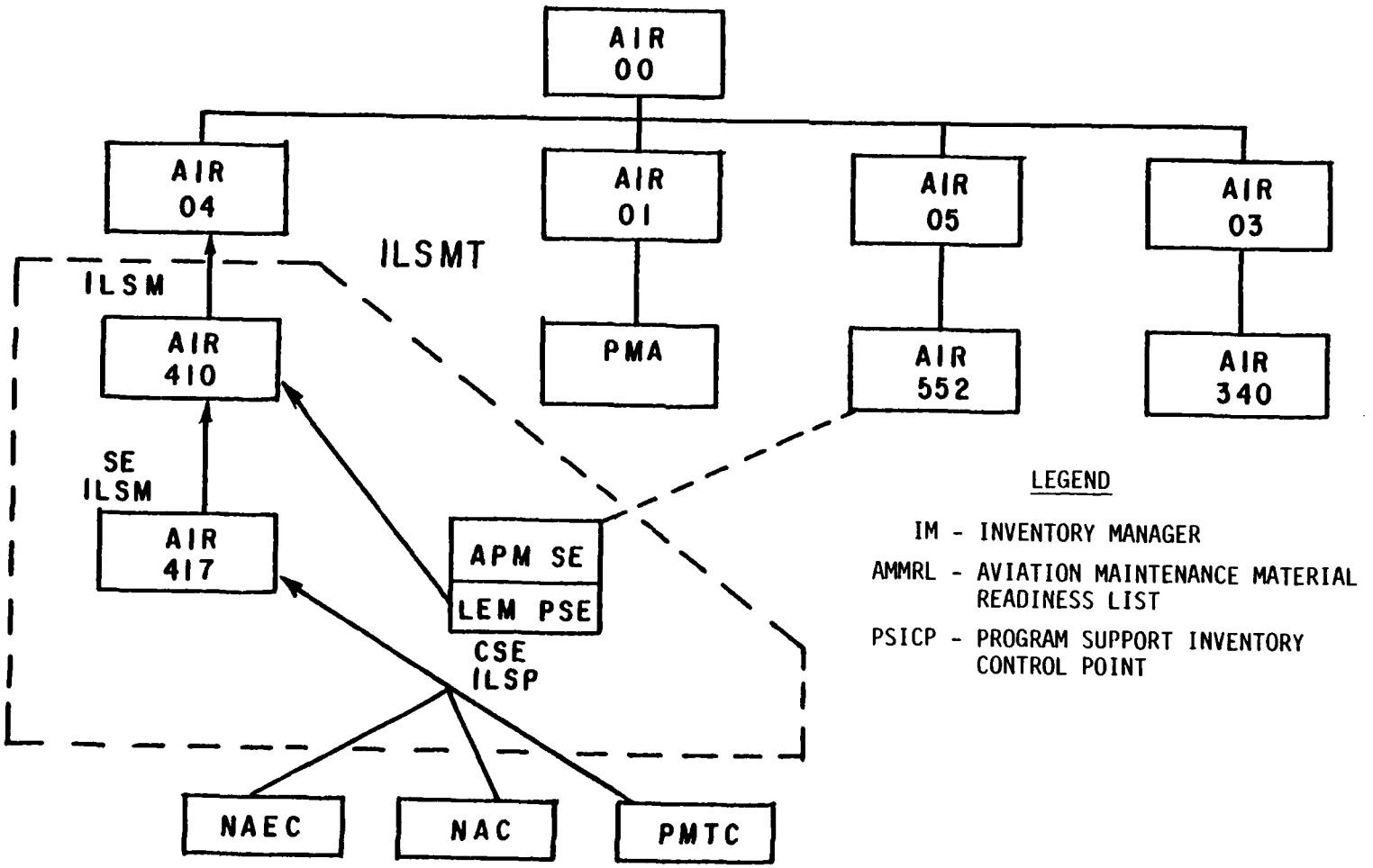
There are two advantages in this arrangement. First, support equipment has been elevated to an appropriate level of management, so that its importance is institutionally, as well as functionally, acknowledged. As a consequence, if trade-offs must be imposed to the detriment of support equipment, they may be readily reviewed at the proper management level. Second, NAEC, with its depth of engineering experience, relieves the AIR-552 staff of many highly detailed and technical tasks, thus permitting the Program Manager for Support Equipment to concentrate on planning and coordination.

Integrated Logistics Support (ILS) management is another function performed within the matrix concept (see Figure 2-3). AIR-410, the Logistics Management Division, usually assigns the ILS manager who heads the ILS Management Team for the aircraft/weapon system. The ILS Management Team consists of representatives from other functional offices within AIR-04 (ground support equipment, maintenance, supply, etc.) as well as the AIR-552-designated Logistics Element Manager for PSE. The Logistics Element Manager for PSE is normally the Assistant Program Manager for Support Equipment. He coordinates all PSE logistics requirements with AIR-417, the designated ILS Manager for Support Equipment. As the ILS Manager for Support Equipment, AIR-417 provides budgeting and funding requirements for support of support equipment to the Logistics Element Manager for PSE. The ILS Manager also reviews and approves the CSE ILS Plan (ILSP) prepared by the Designated Procuring Activities: NAEC, the Naval Avionics Center, and the Pacific Missile Test Center.

The organization is well conceived, especially for integrating the support of support equipment into the support of the aircraft itself.

FIGURE 2-3

ILS MANAGEMENT



The responsibility for CSE development is vested in two NAVAIR headquarters offices: the Equipment and Support Administration Division (AIR-340) for conceptual and advanced development (RDT&E Category 6.2 and 6.3) programs, and AIR-522 for full-scale development (RDT&E Category 6.4) programs. They jointly review established programs but generally establish their own requirements.

Finally, the Aviation Maintenance Material Readiness List (AMMRL) program is another function supporting weapons system introduction. The AMMRL program provides a system for inventory management of in-use support equipment (except certain items, such as ATE-related test programs sets) by use of support equipment allowance information.

AIR-417 is the program manager for AMMRL (see Figure 2-4) and the Inventory Manager for all support equipment items except equipment under the inventory management of a designated Program Support Inventory Control Point. Appendix B discusses the AMMRL Program further, and describes the participation of the Aviation Supply Office (ASO), the Ships Parts Control Center (SPCC), the Naval Air Logistics Center (NALC), Aircraft Controlling Custodians (ACCs), Type Commanders (TYCOMs), and NAEC.

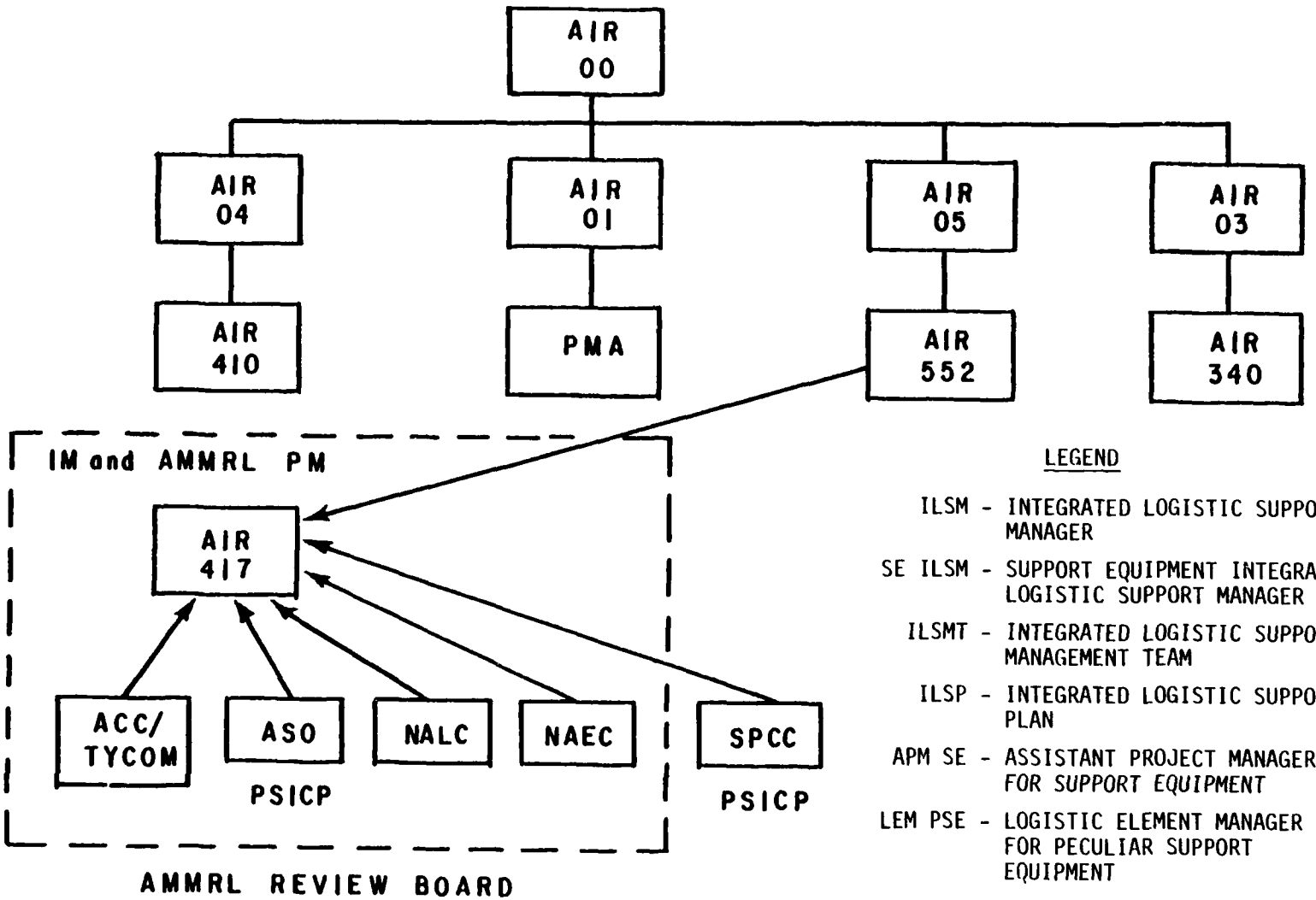
AIR-340, AIR-552, AIR-417 and the Support Equipment Department of NAEC are the principal participants in the design, development, acquisition, procurement, and logistics support of support equipment. All three are organized along similar functional lines which facilitate the interface among the various offices. However, there is no formal coordination within the NAVAIR headquarters for establishing conceptual development requirements.

ORGANIZATION OF AIR-552

The Weapon System Requirements and Acquisition Branch (AIR-5521) deals with specific weapon systems (aircraft, missiles, etc.), and assigns the

FIGURE 2-4

AMMRL PROGRAM



LEGEND

ILSM - INTEGRATED LOGISTIC SUPPORT MANAGER

SE ILSM - SUPPORT EQUIPMENT INTEGRATED LOGISTIC SUPPORT MANAGER

ILSMT - INTEGRATED LOGISTIC SUPPORT MANAGEMENT TEAM

ILSP - INTEGRATED LOGISTIC SUPPORT PLAN

APM SE - ASSISTANT PROJECT MANAGER *FOR SUPPORT EQUIPMENT*

LEM PSE - LOGISTIC ELEMENT MANAGER FOR PECULIAR SUPPORT EQUIPMENT

Assistant Program Manager for Support Equipment who supports the PMA on all support equipment matters during the development and acquisition of the weapon system. The Assistant Program Manager also acts as the Logistic Element Manager responsible, as a member of the ILS Management Team, to AIR-410 for PSE. AIR-5521 also deals with support equipment plans and programs, site activation, and armament/missile/weapon control systems support equipment. AIR-5521 interacts with both the Support Equipment Program Branch (AIR-4171) and the Weapon Systems and Avionics Support Equipment Branch (AIR-4172) on logistics support of support equipment and with the NAEC Weapon System Management Office (Code 92A4) on the design and support of PSE/CSE for specific weapon systems.

The Avionics System Support Branch (AIR-5522) deals with Automatic Test Equipment (ATE), General Purpose Electronic Test Equipment (GPETE), and electromagnetic compatibility of support equipment and is responsible for development of PSE and CSE in those areas. AIR-5522 interacts with AIR-4172 and the NAEC Avionics Support Equipment Division (Code 925).

The Propulsion Systems Support/Handling and Servicing Equipment Branch (AIR-5523) has cognizance over PSE and CSE for propulsion systems; aircraft servicing, handling, and maintenance equipment; fire fighting and crash/salvage equipment, and armament handling equipment. AIR-5523 interacts with the Servicing/Handling Equipment Branch (AIR-4173) in all of the above areas and with the NAEC Propulsion Support Equipment Division (Code 926) and the Handling and Servicing/Armament Division (Code 927).

The three AIR-552 branches assign Acquisition Managers for Support Equipment who support the Assistant Program Manager from AIR-5521 in their areas of cognizance. The three AIR-417 branches assign Logistics Managers for Support

Equipment who interface with the Logistics Element Managers PSE from AIR-5521, all of whom are responsible to the ILS Manager.

CONCLUSION

- The NAVAIR support equipment management organization is good. In almost every aspect of the matrix concept for management of support equipment, the two key NAVAIR offices are AIR-552 (Program Manager for Support Equipment) and AIR-417 (Logistic Manager for Support Equipment). The matrix concept provides for interacting responsibilities so that each office must respond to the other according to the function to be performed. Concurrently, the execution of those responsibilities must support the PMA with respect to the development of the aircraft or weapon system. The organizational concept provides a system of checks and balances within which all the functional and program offices must operate with due respect for each other's responsibility and authority. This interplay of functional and program responsibilities and authority is a notable organizational strength.

- The responsibilities of all the participants in support equipment development are spelled out and reiterated in several NAVAIR directives. Although some of the directives are out-of-date, the organization and responsibilities set forth constitute a comprehensive, time-phased program of management review, but do not provide a formal coordination for establishing developmental requirements.

- The AIR-552 Division had 8 vacancies out of 22 supervisory billets at the commencement of LMI's review. These include the Assistant Director (recently filled by the former Technical Director, whose position is now vacant), one branch head, and four section heads. The impact of these vacancies was not analyzed, but should be considered negative.

3. SUPPORT EQUIPMENT DEVELOPMENTAL REQUIREMENTS AND FUNDING

INTRODUCTION

This chapter discusses the examination of the method of identifying development requirements for both CSE and PSE including the examination of timing, magnitude and prioritization of funding requirements. The funding of support equipment development differs depending on whether the development is to be funded through the PMA for PSE or through the PMSE for CSE.

REQUIREMENTS IDENTIFICATION

The identification of requirements to develop support equipment may be initiated by contractors, NAVAIR headquarters (AIR-340, AIR-552), field commands, and the fleet. The identification may be for CSE or PSE to support a specific weapon system in the procurement process or it may be for new equipment to replace existing equipments, either to promote standardization or to meet requirements identified during TECHEVAL, OPEVAL or fleet introduction of a weapon system. It also may be for conceptual development to prepare for the introdution of forthcoming advanced technology.

PSE DEVELOPMENTAL PROCESS

Most PSE requirements are identified by the prime contractor during the acquisition process as described in Chapter 4. Some of the PSE recommended by the contractor may require development.

Formal consideration of the support equipment recommendations normally occurs when the weapon system is in the full-scale development phase, even though NAEC, through liaison with in-plant representatives may have prior information about support equipment development and procurement requirements. If the recommendation for PSE is validated and approved by the NAEC and the

equipment requires development, AIR-552 identifies the requirement to the weapon system PMA for funding under RDT&E funds for an in-production weapon system. If the weapon system is out-of-production, AIR-552 provides funding from full-scale development (RDT&E Category 6.4) funds under his allocation control. The criteria for evaluating the validity of a recommendation for PSE development is based upon whether an alternative equipment exists as either CSE or as PSE in inventory, or modification of existing equipment is feasible. The development of PSE occurs primarily during the weapons system full-scale development phase. If the development is to be done by the prime contractor, his sub-contractors or vendors, the developmental funds are normally provided to the prime contractor.

There is one variance to the above procedures. ATE requirements are subjected to a Support Equipment Selection Analysis (SESA) subsequent to DSARC Milestone II for the weapon system, but prior to submission of support equipment recommendations by the contractor. The SESA identifies the compatability of current ATE or the requirements for new ATE, and addresses whether the new requirement is to be met by development of peculiar or common ATE.

Occasionally, the development of PSE is not done under the auspices of the prime contractor, but in-house by the Navy or directly contracted by Navy to a contractor other than the prime. One such requirement, the Temperature Limiting Amplifier (TLA)/TRIM Test Set for the Allison TF41 engine was developed in-house by the U.S. Navy Avionics Center (NAC), Indianapolis. The developmental and acquisition program for this item of PSE is described in Appendix C. The program grew out of a requirement identified by the Integrated Logistics Support Management Team during review of the A-7E aircraft acquisition. The action item was assigned to NAVAIR and tasked to NAC.

In his role as Program Manager for Support Equipment, AIR-552 is responsible for NAVAIR engineering support during the development of all support equipment, PSE and CSE, during full-scale development (RDT&E Category 6.4). In this capacity he oversees the developmental efforts regardless of who funds the efforts. As the Program Manager, he may designate developmental programs of PSE for review under the Ground Support Equipment Review Board (GSEARB) procedures. The GSEARB, described in detail later in this chapter, is an in-house NAVAIR board which reviews the developmental and acquisition programs for support equipment, above stated dollar thresholds. It follows procedures patterned after the DSARC review procedures and the acquisition policy guidance contained in DoDI 5000.1 and supporting directives. Although designed primarily for the review of CSE programs it has been applied to PSE programs e.g. the TF41 TLA/TRIM Test Set.

PSE developmental requirements, identified during TECHEVAL, OPEVAL or fleet introduction, are processed and met using the above procedures.

CONCLUSIONS

- The procedures for PSE development, once the requirements are identified, are satisfactory.
- With the exception of ATE requirements, the timeliness of addressing PSE development requirements may preclude meaningful efforts to influence weapon system design to compatibility with existing or modified CSE, thereby forcing a selection of PSE as the only choice for providing support equipment in a timely manner to match weapon system deployment.

CSE DEVELOPMENTAL PROCESS

The developmental requirements for CSE are also identified by various sources. However, the procedures for validating and meeting the requirements depend on what stage in the developmental process the requirement is initially addressed.

Conceptual and Advance Development (RDT&E Category 6.2 and 6.3) of CSE is under the direction and funding authority of the Assistant Commander NAVAIRSYSCOM for Research and Technology (AIR-03) and administered by the Director Equipment and Support Administrative Division (AIR-340). Most of the programs under the cognizance of AIR-340 are in conceptual development (RDT&E Category 6.2) and consist of approximately 35-40 programs at any given time. About 75 percent of the over-all effort of AIR-340 relates to support equipment conceptual development, and the remaining 25 percent are related to conceptual effort in the fields of testing and measuring techniques to enhance the support of systems utilizing emerging technologies, e.g., support of fiber optics systems, nondestructive evaluation of new airframe composite materials. There is no formal documentation that the results of conceptual development of these projects in support equipment are subsequently considered in weapons system design.

The identification of conceptual development (RDT&E Category 6.2) requirements is primarily accomplished by AIR-340 in conjunction with the NAEC. NAEC submits development recommendations and proposes the allocation of resources to AIR-340 who submits POM and budget inputs in accordance with established procedures. Conceptual development is accomplished under the cognizance of the NAEC, by NAEC itself, by other Navy field activities or under contracts for commercial engineering support. The RDT&E Category 6.2 effort at the NAEC, both in-house or by other activities or by contractors, is conducted or monitored by the same divisions of the NAEC Support Equipment Department that provide engineering support in other aspects of support equipment. It is presently planned to staff an office within that NAEC department to exclusively address conceptual development of support equipment. There is no formal liaison within the NAVAIR headquarter between AIR-340 and AIR-552 in

the requirements identification process. Reviews of conceptual development (RDT&E Category 6.2) programs are conducted quarterly at the NAEC under the auspices of AIR-340. These reviews examine ongoing programs and make adjustments as required. During the reviews, the Work Unit Plans (WUP) for the various tasks in conceptual development are updated or modified. WUP's are the documented Progress/Plans and Milestone Summaries for the conceptual development. AIR-552 has participated in these reviews through the attendance of the division Technical Assistant (AIR-552B). That billet is presently vacant. The WUP's are promulgated to the interested offices of the NAVAIR headquarters, including AIR-552.

Advanced Development (RDT&E Category 6.3) requirements for support equipment are primarily identified by AIR-340 with some input by AIR-552 via the GSEARB process. There has been a very low level of activity in RDT&E Category 6.3 in recent years. However, there appear to be no problems which would preclude a procedurally acceptable identification of RDT&E Category 6.3 requirements.

Full-Scale Development (RDT&E Category 6.4) of CSE is under the direction and funding authority of the Assistant Commander NAVAIRSYSCOM for Material Acquisition (AIR-05) and administered by the Director, Support Equipment Division (AIR-552). There are currently 26 projects under full-scale development; they are funded at $5.9 million. These projects are in three RDT&E line items under Program Element 64215N: A/C Handling and Servicing Equipment, A/C Salvage and Handling Equipment and Aviation ATE (see Appendix D). Each of the line items is supported by required documentation. Candidate requirements for full-scale development are initially identified through various methods: migration from RDT&E Category 6.3 to 6.4, in-house by AIR-552, NAEC, other field activities or by fleet inputs. These projects are designed to increase

standardization of support equipment through replacement of existing obsolescent equipment with new common equipment, develop common equipment to meet emergent requirements and to upgrade current CSE. In-house and contractor engineering support for RDT&E Category 6.4 is provided by the NAEC.

POM/Budget Process for CSE development follows the prescribed procedures in NAVAIR. The recommended funding and prioritization for RDT&E Category 6.2/6.3 for support equipment is prepared by AIR-340. The recommended funding and prioritization for full-scale development (RDT&E Category 6.4) for CSE is prepared by AIR-552. Both submits are reviewed and approved through the normal POM/Budget process.

CONCLUSIONS

- There is little, if any, formal coordination within NAVAIR headquarters between AIR-340 and AIR-552 on conceptual development (RDT&E Category 6.2) for CSE.
- There is good coordination between AIR-340 and the conceptual development engineering support field activity, NAEC.
- There is no formal mechanism which ensures that testing, measuring and other design requirements for supportability are suitably addressed during weapon system design.

INTEGRATION OF CSE DEVELOPMENT INTO THE ACQUISITION PROCESS

The management of the development and acquisition of CSE is broadly governed by NAVAIR Ground Support Equipment Division Directive 5000.1 of 21 March 1975. The directive promulgates policy and guidance for aviation support equipment acquisition planning and management. It is designed to assist acquisition managers, and others, in establishing orderly procedures, reviews and critical decision points during the development and acquisition process. The policy and guidance contained in the directive apply to all CSE acquisition projects, as well as to a few PSE acquisitions, as designated by the Program Manager (AIR-552).

Directive 5000.1 complies with the directives of higher authority and is compatible with the policies and procedures of DoDI 5000.1. Where variances exist they are justified by the difference in scope and management complexity between systems defined as major systems under DoDI 5000.1 and equipments for which the Program Manager Support Equipment is responsible.

The NAVAIR directive promulgates three primary elements of general policy.

- Every GSE[1] acquisition project must be supported by a practical life-cycle plan including life cycle cost projections.
- The life cycle plans must incorporate intensive and comprehensive developmental testing and technical evaluation. The T&E must be completed prior to committing the systems/equipment to fleet service. In most cases, the T&E shall be completed prior to release for full-scale production.
- The life cycle plan must address all elements of the acquisition planning process (R&M, ILS, T&E, etc.).

THE GSE ACQUISITION REVIEW BOARD (GSEARB)

The GSEARB is a formal board established by Ground Support Equipment Division Directive 5000.1 which performs program monitoring responsibilities and functions for the Program Manager Support Equipment. It is normally composed of seven members from the Support Equipment Division (AIR-552), GSE Logistics Management Division (AIR-417) and the Equipment and Support Administration Division (AIR-340). The GSEARB is normally convened three times during the development and acquisition process for decisions at the completion of the phases described below. The GSEARB I is normally chaired by AIR-340E. The GSEARB II and III are normally chaired by the Deputy Director, Support Equipment Division (AIR-552A). The GSEARB III review is integrated with the Budget, Funding, Procurement Review Board (BFPRB) process described in Chapter 4 of this report.

[1]GSE denotes ground support equipment, an outmoded phrase which is synonymous with support equipment.

The GSEARB formal review is required for CSE programs and designated PSE programs wherein development costs (regardless of appropriation, source of funds or type of contract) exceed $400,000 and/or procurement costs to achieve inventory objectives exceeds $1.5 million. Programs which do not meet the prescribed dollar thresholds are subjected to informal reviews, using GSEARB procedures (particularly to address Test and Evaluation (T&E) and Approval for Service Use (ASU) requirements), by Branch Heads, Acquisition and Logistics Managers.

Development and Acquisition Phases

Development and acquisition phases are related to three decision points in the development and acquisition processes, shown in Figure 3-1.

- Project Initiation Phase, consisting of the

  Conceptual Phase
  Validation Phase

- Full-Scale Development Phase

- Production/Deployment Phase

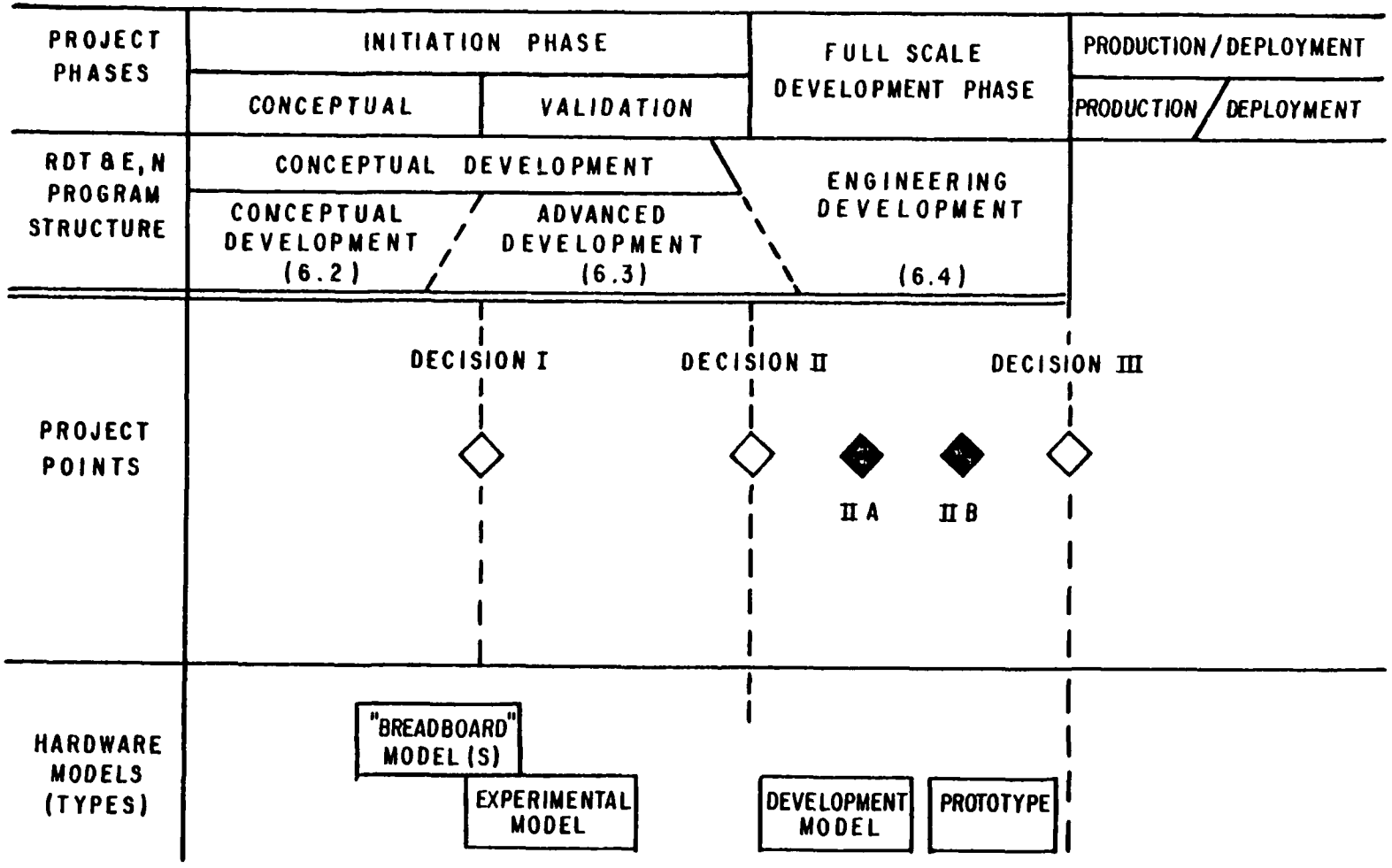
Project Initiation Phase

The project initiation phase is sub-divided into the Conceptual Phase and the Validation Phase.

The Conceptual Phase embodies the development effort to identify a system/equipment concept to meet a valid operational requirement. It broadly defines, quantifies and analyzes the operational requirements, alternatives trade-offs, technical risks, cost schedule, maintenance and logistic support-ability, demonstrates technical feasibility and develops a project plan. The project plan is contained in the Program Element Master Plan (PEMP), described later in this chapter. This phase is terminated at Decision Point I, at which point the decision regarding further development is made. The effort in this

FIGURE 3-1

DEVELOPMENT AND ACQUISITION PHASES



phase usually is performed under RDT&E Category 6.2 program funds. Decision Point I equates to DSARC Milestone I.

The Validation Phase embodies the refinement, verification and update of the efforts of the preceding phase. During this period a development plan and advanced procurement plan are drawn up. The operational support concept and the requirement for the system/equipment is revalidated, including alternatives, logistic needs and cost estimates (including estimates of life-cycle cost). T&E criteria are also established at this time. This phase is normally funded under RDT&E Category 6.3. The validation phase ends with Decision Point II which is an assessment of the military value and readiness to proceed to full-scale deployment. This decision point equates to DSARC Milestone II.

Full-Scale Development Phase

During this phase the system/equipment design is completed and developmental models or prototypes are fabricated and subjected to test and evaluation. This requires complete definition of the system baseline configuration with specifications and drawings and identification of the detailed ILS requirements, which are incorporated into an Integrated Logistic Support Plan (ILSP). Test and evaluation results are documented and suitability and supportability are certified. Measures to obtain certification of ASU are initiated and costs are reviewed to ensure they are acceptable in view of over-all requirements and plans. This phase corresponds to full-scale engineering development and is funded under RDT&E Category 6.4 funds. The full-scale development phase ends with Decision Point III at which time the decision to proceed with production is made. This decision point equates to DSARC Milestones III and IV.

Production/Deployment Phase

During this phase the system/equipments are produced and delivered for deployment with designated aviation activities.

All of the functions required during the above phases are required to be included in an appropriate milestone plan which is reviewed by appropriate levels of management and the GSEARB.

Development of Automatic Test Equipment (ATE)

The development of ATE has not followed the GSEARB procedures described above. In the early 1970's the major focus of NAVAIR attention to ATE was on the Versatile Avionics Shop Test (VAST). VAST is capable of performing diagnostic tests on the avionics equipment installed in various types of operational aircraft. By the late 1970's the problems arising from increased dependence upon ATE, growing complexity of ATE and associated test program sets (TPS), and escalating costs had fostered intensive management efforts to limit the proliferation of peculiar ATE by developing a standardized set of ATE. In 1978, Commander, Naval Air Systems Command (COMNAVAIRSYSCOM) described the specific elements of the NAVAIR family of ATE and reiterated the hierarchy of preferred options for future support equipment, i.e., enhancement of current test systems, development of derivative systems, and last introduction of new systems. COMNAVAIRSYSCOM required all PMAs, Logistics Managers, and project coordinators to provide avionics support planning data to the Program Manager, Support Equipment (AIR-552). This includes avionics maintenance and testing requirements, avionics support requirements where current equipment was inadequate or obsolete, and recommendations or suggestions for required support not provided by the family of ATE. COMNAVAIRSYSCOM further required the Program Manager, Support Equipment to conduct a Support Equipment Selection Analysis (SESA) for requirements and recommendations for

ATE to facilitate optimum selection of support equipment. To enforce these policies, COMNAVAIRSYSCOM required that all ATE proposals, not in the prescribed family of ATE and not approved by the Program Manager, Support Equipment for design, development, or acquisition, must be approved by the Commander. These policies were reaffirmed in 1980, and elements of the NAVAIR family of ATE were more precisely defined.[2]

The ATE Program Plan

The ATE Program Plan is a long-range plan for the development of ATE. It is prepared by AIR-552. It is a general concept for integrating ATE requirements imposed by future avionic and non-avionic systems. The plan has seven goals:

- integrate ATE program management
- improve ATE acquisition
- design avionics for testability and maintainability
- minimize the variety of ATE
- consolidate and improve ATE software
- improve the quality of Test Program Sets (TPS)
- attain full and timely organic capability.

An example of conceptual planning to reduce proliferation and improve ATE is the Consolidated Support System (CSS). It is NAVAIR's plan to minimize the variety of ATE. CSS conceptual planning recognizes that by late 1980's the current ATE will not satisfy support requirements. The concept of the CSS is to provide a common ATE system to encompass all forseeable ATE requirements through the year 2000 and beyond. The Initial Operational Capabiility (IOC) date is CY 1991.

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[2]Commander Naval Air Systems Command memo serial 130/1057 of 25 September 1980.

The CSS plan provides for an integrated system that stresses functional commonality, flexibility, standardization of equipment, increased throughput, and improved reliability and maintainability. Specifically, it provides for:

- identical hardware/software for any avionic test function
- multiple test station assignment for any avionics test requirement
- standard end items for logistic support
- standard training
- standard skills
- transportability of application software
- standard facilities
- standard facilities management and projection control procedures
- standard ATLAS computer language

Digital Test Program Set Generation (TPSG)

In the interim, AIR-552 is addressing a current problem area in ATE, the high cost of Test Program Set (TPS) manual software development, which is currently greater than the cost of associated ATE hardware. The TPS is a PSE item which acts as the interface device between the unit under test (UUT) and the common ATE. The development of digital Test Program Set Generation (TPSG) is currently funded by AIR-552 in RDT&E Category 6.4 (see Appendix D), for both digital and analog devices. Another approach, under consideration but not yet implemented, is to conduct competitive procurement of test programs. One difficulty is the time delays resulting from preparation of a competitive RFP, solicitation, evaluation, and award, which impede timely availability, and which is a result of late identification of requirements.

These on-going efforts are well conceived and, if successful, will be a major step to further standardization. It is probable, considering the

potential scope of the CSS program, that the program will be subject to DSARC review. To date, no avionics SE or ATE program has been subjected to the GSEARB procedures specified in NAVAIR directives.

Selected Analyses of Support Equipment

Analyses of selected programs were made to evaluate the effectiveness of the development of GSEARB procedures. The detail results of the analyses are contained in Appendix C. The two programs selected, Jet Air Start Units (JASU), a CSE item, and the TF41 TLA/TRIM Test Set, a PSE item, were both subjected to the required analyses and review during the GSEARB process and are examples of the sound management procedures utilized during the developmental process for support equipment.

CONCLUSIONS

- The GSEARB process is sound. Its membership is comprised of the cognizant personnel.
- The analyses preceding the submission of programs for GSEARB review appear to be thorough and apply the appropriate pre-acquisition disciplines. The GSEARB process facilitates proper management review of the development and acquisition of support equipment for those programs which are designated for review.
- The GSEARB should be more widely utilized including application to avionics support equipment and ATE development and acquisition. An evaluation should be made of the feasibility of GSEARB review of high cost or technically complex items of PSE whose selection process is presently limited to the approval procedures designated for the review and approval of contractor's recommendations.

PROGRAM ELEMENT MASTER PLAN (PEMP)

PEMPs are overall plans for the development and acquisition of certain common A/C Handling and Servicing Equipment and A/C Salvage and Handling Equipment and designated peculiar support equipments. The PEMP consists of an executive summary and supporting analyses and studies which are designed to address all ILS disciplines in planning for developing, supporting, testing and introducing a new item of SE into the inventory. A plan normally contains

an examination of operational needs and the existing capability, an evaluation of alternatives, an economic analysis and the recommended plan for development and acquisition, plus a Plan of Action and Milestones. It also contains the applicable Logistics Support Analysis and an Integrated Logistics Support Plan. The attachment to Appendix C list 26 documents of the type normally prepared as part of a PEMP.

PEMPS are in being or being prepared for 18 commodity areas for common handling and support equipment of the type normally called "yellow gear." The commodity areas are:

A/C handling vehicles	Turbo shaft engine test stands
Armament handling equipment	Hydraulic servicing equipment
Air conditioning	Cryogenics/compressed gases
Air start systems	Inspection equipment
Corrosion control equipment	Electrical servicing equipment
Fire fighting equipment	Ancillary handling equipment
Turbo fan jet engine test stands	Ancillary maintenance equipment
APU/GTC engine test stands	In airframe engine test sets
Turbo prop engine test stands	Crash equipment

PEMPs have also been prepared for some PSE, e.g., TF41 TLA/TRIM test set.

There is no documented requirement for PEMPs. The practices of preparing PEMPs grew out of the need to document the planning process. The PEMPs are prepared primarily by NAEC; other field activities such as NAC, NATC, NALC, prepare selected portions.

The PEMPs are updated at least every two years, more frequently for certain high interest items undergoing development.

CONCLUSIONS

- The requirement to use PEMPs and guidance for format and content should be promulgated in a NAVAIR Instruction.
- The PEMP process is an excellent planning process whose use should be expanded to include more commodity areas, particulary avionics support equipment and ATE.

4. SUPPORT EQUIPMENT REQUIREMENTS IDENTIFICATION

INTRODUCTION

This chapter addresses the processes that support the identification of qualitative and quantitative requirements for support equipment.

The first section is a description and analysis of the Support Equipment Recommendation Data (SERD) process. This is a formal process through which the proposer of a support equipment application identifies the function requiring support and presents his recommendation for meeting this requirement. The process is a contractual requirement which must be followed by the contractor for all new weapons systems developments. It is also used for any other proposal affecting the application, development or allowance of a support equipment item.

The next two sections deal with the quantitative (i.e. dollar) requirements for PSE and CSE items. Since these processes are distinctly different, they are separately addressed. These sections describe the processes employed in NAVAIR to support funding requests in the POM/budget process with special emphasis on the development of cost data.

THE SUPPORT EQUIPMENT RECOMMENDATION DATA (SERD)

When a new weapon system acquisition program is approved for full scale development, the contractor is required to submit an Integrated Logistics Support Plan (ILSP). This is reviewed by AIR-410, with input from AIR-552 and AIR-417, to assure that it adequately addresses support equipment requirements. The ILSP includes the Logistic Support Analysis and the Level-of-Repair Analysis. These provide a basis for maintenance decisions and the

identification of the most economical level of repair. Prior to the submission of the ILSP, the Resident Integrated Logistic Support Detachment (RILSD) is formed to monitor the development of the ILSP, including support equipment item identification. AIR-552 and AIR-417 are usually represented by NAEC. ATE is addressed by a modified procedure. If it appears that the contractor may propose the use of ATE not in the NAVAIR family of ATE, then, as soon as possible after DSARC Milestone II, a Support Equipment Selection Analysis (SESA) is performed (usually by NAEC). The SESA process first looks at avionics test requirements and capabilities of candidate support equipment, then examines the compatibility of existing and proposed support equipment and the units under test to produce a set of viable options. It next examines the maintenance workload and the life-cycle costs for each option. The final steps in the SESA examine the contractual implications and the technical risks for each option. The result of a SESA is a decision to utilize existing or modified ATE, or to develop a new ATE end item, either CSE or PSE.

With the completion of these steps, the contractor begins the formal process of identifying support equipment requirements. To accomplish this he employs the SERD, which is a standard set of data formats designed to provide two groups of data about a support equipment item. The first group describes a function requiring support and proposes how this requirement can be met by recommending either a PSE or a CSE item for the purpose. The second part of the SERD provides procurement, logistic support and allowance data.

The SERD are designed to assure that there is effective control within the Navy over the process of selection, development (if necessary), allowance determination, procurement and support of support equipment for a weapon system and to foster standardization wherever possible. For a more detailed discussion of the SERD format see Appendix E.

The approved SERD is used by NAEC as input into a computerized process that gives to NAEC a means to compute individual base loading requirements for intermediate and organizational maintenance levels by aircraft type. This permits NAEC to convert the Weapons System Planning Document (WSPD) base loading schedule for a given year into quantitative requirements by support equipment item, to place orders for procurement with the Administrative Contracting Officers and to track the movement (which NAEC can control) of selective equipments from the manufacturer to the activity.

The approved SERD also serves as the primary source document for the Aircraft Maintenance Material Readiness List (AMMRL) Program. After approval by NAVAIR HQ/NAEC, copies of the SERD are sent to ASO or SPCC who are responsible for processing the approved or revised SERD's and assuring that the appropriate data are entered into the ADMRL file. The remainder of this process is discussed in Appendix B, which describes the ADMRL/IMRL process.

The use of the SERD to foster standardization is effective only to the extent that the proposer, usually the contractor, conscientiously pursues the possibility of using equipment already in the government inventory. However, there appears to be no incentive for him to do this. On the contrary, it may profit him to recommend a new PSE item. The Navy review process may overcome this deficiency by identifying items already in the the inventory that the contractor may have missed or ignored. But this opportunity is limited by the availability of manpower and by the point, in the weapons system development process, at which the SERD's are submitted.

Under the best of circumstances the SERD's are submitted when the component configuration of the weapons system is substantially fixed. At this point, it is difficult to do more than identify CSE items that may have been overlooked. For the Navy to effectively influence the standardization process

for support equipment, it is necessary to be involved as early as possible in weapon system development. In the F/A-18 program, for example, during the pre-award period, AIR-552 examined the procurement package to ensure inclusion of appropriate MILSTDs and other written requirements, e.g., compatibility with existing ATE. AIR-552 subsequently participated in proposal evaluation. Later, NAEC representatives were placed on-site at the contractor's facilities as part of the RILSD to participate in design reviews. This participation covered all phases including preliminary design, critical design, and detailed design prior to engineering development. NAEC believes that this practice is responsible for the noticeable drop in the rate of SERD disapprovals. The rate for the F-14 was 35 percent. For the F-18, where a on-site rep has been employed, the rate is down to 14 percent.

PSE POM/BUDGET PROCESS

The same process is used for generating data for input into both the POM and budget submissions for PSE. NAVAIR 552 has developed a computerized process in which data gathered from several sources are maintained in a data file, and a standardized computer output is provided. This computer output is used as a basis for a memorandum to each weapon system PMA which specifies the PSE APN 1-4 dollar requirements for the POM period for his program. The requirements are divided into three commodity groupings: airframe, propulsion handling and servicing, and avionics. These data are used by the PMA, either as presented by AIR-552 or as amended by the PMA, to develop his submission for the POM or budget process. There is no formal feedback by the PMA to AIR-552 of the reasons for adjustments. However, AIR-552 believes that adequate explanation of adjustments are received informally and that there is adequate opportunity to contest decisions by the PMA. Prioritization of PSE requirements is accomplished on a weapon system basis, with the PMA having

principal control over how funds will be allocated. AIR-552, as the Program Manager for Support Equipment, has an opportunity to reclama decisions made by the PMA.

The technique developed by AIR-552 to provide estimated PSE cost data, by program, is largely a computerized process which permits AIR-552 to respond quickly to requests for funding data. The technique also generates an audit trail back to the costs for each component system.

The basic elements of the PSE cost development system are as follows:

- A file of over 1000 different component systems, which can be assembled in different configurations to approximate all of the components of an aircraft for which PSE must be provided. As an example, there is one air frame system in the file for each aircraft type in the Navy inventory. All airframe PSE costs are rolled-up and displayed as initial allowance costs for each level of maintenance (organizational, intermediate-ship, intermediate-land, depot) for each of ten aircraft quantity spreads depicted in Figure 1b of the SERD. As another example, for each NAVAIR A/C propulsion system there is a separate system in the file containing a summary of the PSE costs for that propulsion system. The number of individual items of PSE reflected in the estimated costs for an individual component system can range from one to thousands.

- The Weapons System Planning Document (WSPD), a product of NAVAIR 101, which is mechanically fed into the AIR-552 POM data file. The WSPD tells how, where, and when the aircraft will be employed. It gives procurement and inventory data and milestones, carrier/ship employment assignments and base loadings, rework activities, planning factors, flying hours, and maintenance and spares policy. Separate base loading updates are also provided in the same manner.

The computer output for a given weapon system is extensive; it includes a file of the component systems used, then a phased display of recurring costs by site to support the base loading schedule, a list of recurring and non-recurring costs by component system, and a summary printout for the FYDP period plus the four preceding fiscal years. For each year the required recurring (PSE procurement dollars) and non-recurring costs (front-end engineering, design and logistics costs) are displayed, as are any funds that may have been directed (allocated), by year. The summaries are provided in current FY,

escalated, and constant dollars for any selected year. A sample copy of the requirements summary sheet is at Figure F-1 (Appendix F).

There is no formal process for development of the cost estimates which are provided for each of the component systems identified in the file. They are developed by the AIR-552 engineers who are responsible for the systems. The basis for these costs vary. For new systems, the costs may be based on those developed for analogous systems and modified by the engineer. For mature systems, the costs may be the original estimates which have been updated on an informal basis to reflect the SERD cost estimates.

For weapon systems in the conceptual and advanced development stages, the guidance received by AIR-552 in the POM call memorandum issued by AIR-801 will identify an analogous aircraft with perhaps the addition or exclusion of some component systems to be used as the basis for price estimates. This is easily accomplished using the POM computer process. For example, in the FY 83 POM submission, an estimate of costs for the UHX helicopter, currently in the conceptual phase, was developed using the system costs for the SH-60B helicopter (with modifications and escalation added) and phase-in and base loading data provided by AIR-101. The product of this effort was a phased, recurring cost estimate to cover all outfittings plus initial spares of PSE. A non-recurring cost estimate to cover logistics support and development costs was also provided. When these costs were originally developed for the LAMPS helicopter, AIR-552 used a configuration identification list to identify the component systems to be used as a basis for POM estimates. As indicated below, AIR-552 considers these estimates to be the best available using current methods, but would like to improve their methods. (We did not validate the accuracy of the estimates during this review.)

The POM computer process has great utility. It can be used to provide detailed POM and other cost estimates with audit trails to component systems for every weapon system. (Even when the file of component system costs is not used, the cost estimates which have been used by the PSE engineer are recorded in the computer file). The system is flexible in that adjustments, such as outfitting changes, can be easily accomplished. The process also can be used to determine a strategy constrained by available funds by manipulating outfittings or individual activity capabilities to support individual component systems.

The computerized POM process now used by AIR-552 is not considered to be without some shortcomings. They recognize that improvements could be made. Some of these are in process; others are still in the conceptual stage. However, almost all improvements may be slowed by shortages of manpower and computer capacity.

One needed improvement involves PSE cost estimates during advanced development phases of a weapon system. Although the current method of basing costs on analogous systems provides a basis and audit trail for these estimates, it has recognized shortcomings. The missing link, an acknowledgement and consideration of costs resulting from increased complexity, requires some form of parametric analysis, in addition to the present method of using costs for existing comparable systems plus price escalation. This is an area that warrants further examination.

A similar improvement could be made during the latter phases of the weapons system life cycle, i.e., during the production/deployment and operational support phases. During this period both allowances and estimated costs for individual PSE items are being refined in the SERD process. However, because of the present technique for developing aggregated PSE cost estimates

for each component system in the file, it is almost impossible to reflect these refined data against the proper component system on a timely and incremented basis. In fact, it is not clear that the system costs ever reflect an accumulation of all the PSE costs for that component system as reflected either in SERD estimates or actual incurred costs.

A solution to this problem is mechanized input and utilization of the SERDs. Work is underway on the mechanization of this process; the SERD format has been programmed and some data input has been tested. Full mechanization of the SERD is not planned in the immediate future. Complete accumulation of all SERD data directly from contractors is even further away. Full mechanization of the SERD could eventually provide a process in which engineer cost estimates would be gradually replaced with more current costs estimates. Further refinement could be obtained by inputting actual procurement costs into the data bank. This process would also eventually contribute to a sounder basis for cost estimates (even with those which might employ parametric estimating techniques) during the conceptual and advanced development phases of a new weapon system.

CSE POM/BUDGET PROCESS

The POM/budget process for the acquisition of CSE is described in NAVAIR Instruction 13610.1, "Planning Programming, Budgeting, Procurement and Integrated Logistic Support for Common Support Equipment (CSE)." This Instruction defines responsibilities for the POM/budget process and, in Enclosure (1) thereto, provides a schedule of events related to the process.

The POM/budget cycle for CSE is initiated in AIR-552 prior to receipt of the POM call from AIR-801. The process begins with an allocation of FYDP targets to branches within AIR-552, with a further suballocation by section within the branches.

In the next step, each section develops individual CSE item requirements on a set of standard AIR-552 formats designed to present budget planning and requirements summary data. The first format provides the functional requirement, descriptive information, and development history. The second format provides quantitative reqirements, inventory data, and a procurement proposal covering the POM/budget period, with two previous years of historical data. The third format provides a summary of budget year funding requirements for acquisition and ILS. Samples of these formats are at Figures F-2, F-3, and F-4 (Appendix F).

The quantitative requirements for all CSE except ATE, are provided by AIR-417 from data gathered from various sources and maintained by AIR-417 in a computerized data file with a small locally developed program called "Support Equipment Automated Computations and Requirements Tabulation" (SEACART). POM/budget data for ATE CSE is developed entirely within AIR-552 using sources similar to those employed by AIR-417. Requirements data sources include the base loading factors from the Aircraft Program Data File (APDF) and ADMRL file allowance data. These data provide requirements for shore based intermediate and organizational level activities and are mechanically computed. Requirements for aircraft carriers, air-capable ships, NARFs, training activities and transient sites are manually inputted based on data obtained from TYCOMs, NALC, Weapons Training Division (AIR-413), and for aircraft carriers, deployment schedules and deck load data applied to the Application Data for Material Readiness List.

For in-use items, the basic inventory source is the Consolidated In-Use Inventory Report, which is a product of the AMMRL program. For NARFs and training activities, which are not reported in the AMMRL program, inventory data is obtained from NALC and AIR-413. All data for individual air-capable

ships are constructed by AIR-417. Procurement and budget data are obtained from NAEC and AIR-552. No pipeline requirements are incorporated in POMs budgets.

Cost data for existing systems are derived from procurement experience and adjusted to reflect cost escalation. For new items, cost estimates are developed from PEMP data and/or the GESARB process and are considered by AIR-552 to be a reasonable forecast of actual costs. For example the engine for the new JASU was estimated at $55,000 in October 1979. In September 1980, a multi-year contract was awarded for $55,000 each with a provision for economic adjustment of the price in future years. In another, perhaps more representative example, the tow tractor procurement cost was estimated at $2.2 million for a quantity of 140 in POM 80; the actual contract price was $1.9 million. (We were not able in the course of this review, to make an independent analysis of the validity of the cost estimation process.)

The products of the individual item computations are reviewed by the branches and adjusted, if necessary, to meet the established funding targets. Then the Budget, Funding and Procurement Review Board (BFPRB), consisting of AIR-552, AIR-417, and the DPAs, is convened to review and adjust priorities to the FYDP targets. After receipt of the POM/Budget Call from AIR-801, further adjustments are made to conform to any target adjustments mandated by the data in the POM call memorandum.

The end product of this effort is an allocation of funds, by CSE end item for those items of CSE selected for procurement. When available funds are less than the computed requirements for all CSE, this process represents the extent of prioritization of needs against available funds within NAVAIR. If quantities procured do not meet allowance requirements, AIR-552 makes bulk

allocations to the Type Commanders, who further allocate within their respective commands to meet unit requirements.

The POM submit is forwarded to CNM/CNO for review as part of the Naval Aviation POM submission. The budget proposal, reflecting adjustments made by higher authority is submitted via channels to OSD/OMB. Final adjustments are made on a line item basis by the BFPRB to reflect the program authorization, and, during the budget execution period, to accommodate cost or program changes.

CONCLUSIONS

- The procedures for identifying support equipment required for a new weapon system, or a new application of support equipment, are well documented in the SERD process. That process is sound, in terms of control of and participation in the process by all interested organizational elements within NAVAIR and the TYCOMS.

  However, the process of standardizing support equipment is inhibited by the timing of SERD submissions. By the time a contractor submits a SERD, the Navy's opportunities for rejecting PSE in favor of CSE may be limited. Earlier consideration of support equipment requirements would enhance the Navy's opportunity to enforce standardization. The possible offsetting disadvantage of early identification of requirements is that the requirements may change, making necessary a change in the selection or design of the support equipment.

  A partial solution to this dilemma is to continue the early positioning of NAEC representatives at the contractors' facilities. This procedure is being followed for the F-18 and appears worthwhile. It should be formalized and made a part of all weapon system contractual agreements. Additional benefits could be obtained through a system of contractor incentivization for the selection of CSE.

- The POM/budget process for PSE cost estimation requires improvement. The need for improvement in specific areas has been identified, and corrective actions are underway or planned. These improvements should be accelerated to permit their early realization. This includes efforts to accelerate the input of SERD costs into the POM/budget data bank, development of parametric model cost estimating techniques, and continuous updating of data to reflect actual, incurred costs. In addition, the data should be improved by including pipeline funding requirements.

- The POM/Budget process for CSE is basically a manual process, carried out by AIR-552 and AIR-417 with input from a large number of sources. The current process collects and portrays all of the requirements and inventory data, but, because of current supporting processes, does so

in a cumbersome manner. This is mitigated by the fact that few items are involved and most dollars are programmed in early years of the life cycle of a specific CSE item. However, further review of the CSE POM/budget process, especially in the areas which support requirements and inventory information, could reveal ways to improve the process.

5. CONCLUSIONS

LMI's management review of the Aviation Ground Support Equipment Program has led to the following overall conclusions:

- THE MANAGEMENT ORGANIZATION AND PROCEDURES FOR ESTABLISHING R&D AND PROCUREMENT REQUIREMENTS ARE BASICALLY SOUND.

Designation of a Program Manager for Support Equipment and integration of the life cycle management of support equipment via the matrix approach to weapon system program management provide the Navy with an excellent organizational structure for managing support equipment development and acquisition. Although the organization is hampered by personnel vacancies and some procedures require modification, the organization and personnel are seriously embarked on an effort to reduce support equipment proliferation through increased standardization. While total standardization may never occur, notable achievements have been made and others are in progress. This has resulted, in part, from efforts to improve identification of resources, definition of requirements based on mission analyses, and analyses of equipment and cost trade-offs. The potential economic benefits from standardization indicates that these procedures should be encouraged and strengthened. To enhance the standardization process the strengths of the GSEARB/PEMP and the SESA processes should be combined to establish a common development and acquisition discipline to be applied to all CSE and to increased amounts of recommended PSE.

- EARLIER CONCEPTUAL CONSIDERATION OF SUPPORT EQUIPMENT REQUIREMENTS WOULD ENHANCE STANDARDIZATION.

The support equipment identification process is by nature a reactive process. It is oriented to identifying the best way to satisfy requirements

established by the aircraft or weapon system design. It has no substantial influence on the design. There appear to be potential benefits in earlier, formal consideration of supportability in the weapon system development process, including a closer integration of supportability and operational design criteria. It may be possible to influence operational design to facilitate a wider application of CSE. One such process has already been demonstrated, the Support Equipment Selection Analysis (SESA) used in ATE identification and selection. By addressing and analyzing ATE requirements prior to submission of the SERD, sufficient time may be available to execute various options (such as, modification of weapon system design, modification of existing CSE or development of new CSE which can be widely utilized) before being forced to select PSE to meet weapon system deployment schedules. Expansion of the use of this methodology to other support equipment selection processes should be examined.

Furthermore, the possibility of incentivizing the contractor to design or develop new CSE or otherwise pursue a more widespread use of CSE should be examined. Such a requirement might be included as criteria to be addressed in response to RFPs. It might also be included as an incentive in procurement contracts.

Intensified management within the support equipment management organization, which is already fundamentally sound, will not significantly reverse the trend toward proliferation. It appears something more must be done. The problems associated with supportability must be more fully integrated into the entire development and acquisition process.

APPENDIX A

DEPARTMENT OF THE ARMY
DEFENSE SUPPLY SERVICE—WASHINGTON
WASHINGTON, D.C. 20310

REPLY TO ATTENTION OF

STATEMENT OF WORK

TASK ORDER NA101

1. ASSIGNMENT: The Logistics Management Institute is requested to undertake this task for the Navy under the provisions of the Secretary of Defense Contract No. MDA903-81-C-0166.

2. TITLE: Management Review of the Aviation Support Equipment Program

3. STATEMENT OF WORK:

a. Background. A briefing was recently presented to the Chief of Naval Operations (CNO) on the status of the aviation support equipment program. The CNO expressed concern about the growth in aircraft ownership costs and suggested a need to have programs which contribute to these growing costs reviewed to ensure effective program management. He subsequently requested the Chief of Naval Material (CNM) to coordinate a management review of the aviation support equipment program. The CNM has directed that such a review be conducted and the results be made available before the Navy makes its final decisions on POM '83.

b. Objective. To decide whether the procedures used by the Navy to establish research, development and procurement requirements for aviation support equipment are sound.

c. Scope. LMI will review the procedures used to establish R&D and procurement requirements for aviation ground support equipment. The review will examine how support equipment requirements are identified, validated and matched against current assets to identify R&D and acquisition needs and how the timing, magnitude and priorities of funding requirements are set. Both common and peculiar support equipment will be included. Training equipment, spare parts, overhaul, calibration, and non-Navy requirements (such as foreign military sales) will be excluded.

d. Products and Schedule.

20 February: Progress briefing to the Navy Study Steering Committee

16 March: Briefing of study results to OP-05 and CNM

31 March: Final written report

4. SPONSOR: RADM R. C. Mandeville, Deputy Chief of Naval Material for Logistics.

5. PROJECT OFFICER: Mr. O.L. Talbot, Assistant Deputy Chief of Naval Material for Logistics.

6. ESTIMATED LEVEL OF EFFORT: 1466 Research Staff hours.

7. SCHEDULE: 2 February 1981 - 15 April 1981.

ACCEPTED:

Perkins C. Pedrick

Phillip H. Miller
Contracting Officer

18 March 1981
Date

APPENDIX B

AIRCRAFT MAINTENANCE MATERIAL READINESS LIST (AMMRL) PROGRAM

A significant part of the SE management process is the determination of allowances for all organizational and intermediate level activities under the cognizance of NAVAIR and the maintenance of an in-use inventory record. This part of the management process is encompassed with the Aircraft Maintenance Material Readiness List (AMMRL) Program[1] which is prescribed in NAVAIR Instruction 13650.1, 2 June 1981.

The AMMRL Program, which is managed by AIR-417, consists of three major elements: the Application Data for Material Readiness List (ADMRL), the Individual Material Readiness List (IMRL), and the Consolidated In-Use Inventory Report.

The ADMRL is a data collection which identifies each end item of aeronautical support equipment required for intermediate and organizational levels of maintenance. SE allowances obtained from Figure 1b of an approved SERD are provided for specific ranges of aircraft or component system.

The master ADMRL file is maintained by ASO, which has the responsibility, along with SPCC, to process all NAVAIR HQ/NAEC approved SERDs into the master files and to provide monthly ADMRL change card notices to NAEC and NALC Detachment West which provides updated tapes to NALC Detachment East. Figure B-1 is a flow chart showing the development and distribution of the ADMRL file, beginning with the receipt at ASO of an approved SERD.

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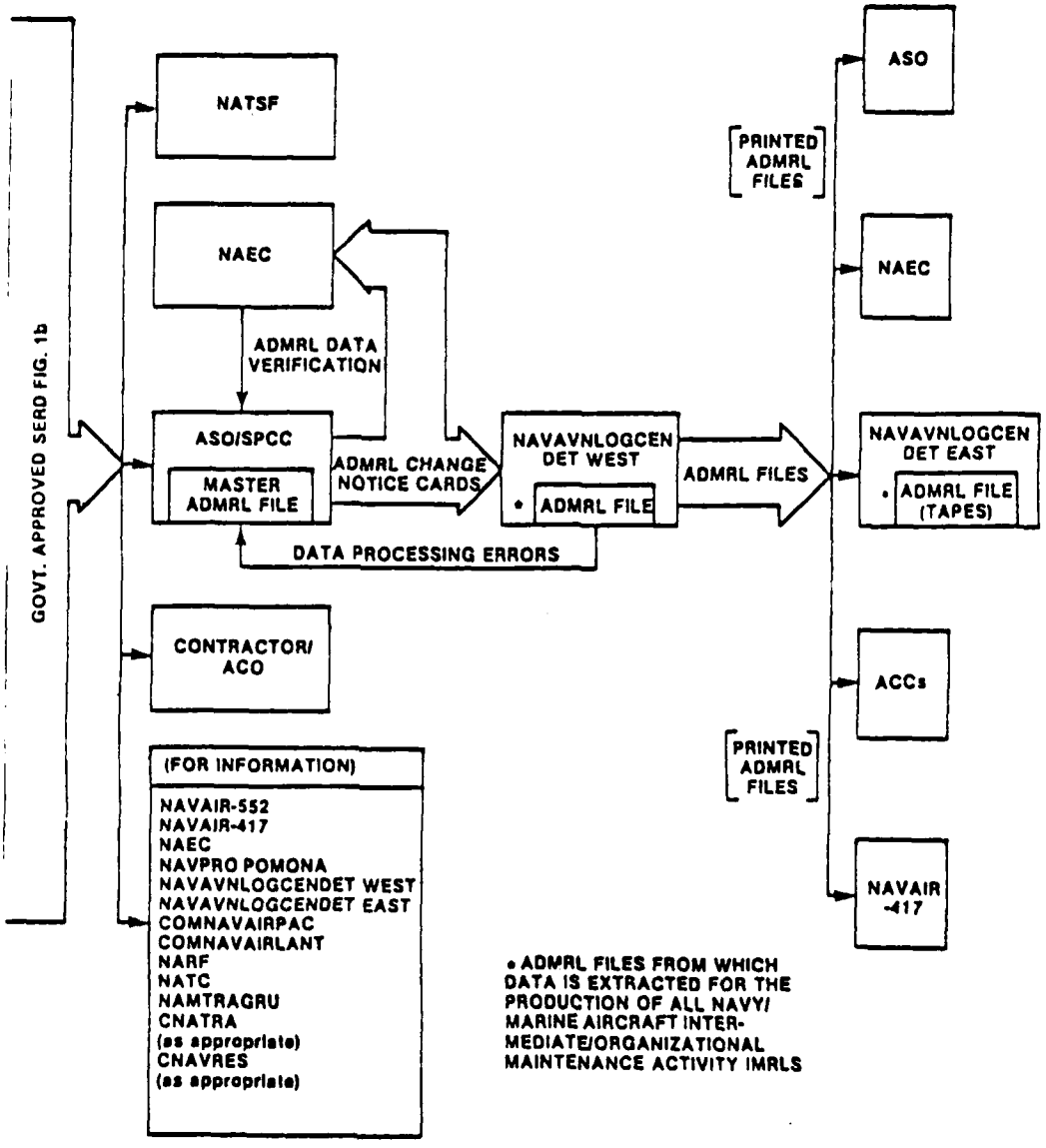
[1]The AMMRL Program does not include consumables authorized by NAVAIR-00-35QG-016 and operational test set programs (OTPS) which are contained in a Tailored Outfitting List.

FIGURE B-1. DEVELOPMENT AND DISTRIBUTION OF THE ADMRL FILE



An IMRL is a consolidated allowance list for a specific organizational or intermediate level maintenance activity. It lists the aggregate support equipment allowances for the activity to support all of the end equipments/ component systems authorized for support by that activity.

IMRLs are prepared by the cognizant NALCDET using ADMRL source data and base and deck loading information provided to them by the ACCs/TYCOMs. Each IMRL is approved by the cognizant ACC/TYCOM and is, therefore, a firm authorized SE allowance for the activity to which the list applies.

The last major component of the AMMRL is the Consolidated In-Use Inventory report which lists, by National Stock Number (NSN) the total requirements and in-use assets for all reportable items of SE in the ADMRL. Two files are maintained: one at NALCDET East for all activities east of the 100th meridian and NAS Dallas, and one at NALCDET West for all activities west of the 100th meridian, except NAS Dallas. The Consolidated In-Use Inventory is continually updated upon receipt of support equipment transaction reports submitted by ACCs/TYCOMs and organizational and intermediate level aircraft maintenance activities which report to them. The NALCDETs submit Consolidated In-Use Inventory reports to ASO, NAEC, NAVAIR HQ, and to the ACCs/TYCOMs on a monthly basis.

AIR-417 chairs the AMMRL review board, convened annually to evaluate and act on recommendations to improve the management or effectiveness of the program. Other permanent members are all ACCs/TYCOMs, NALC and its detachments, ASO, NAEC, and the Commandant of the Marine Corps or his representative. Temporary members from other naval aviation activities are assigned as deemed necessary by the proposed agenda.

APPENDIX C

ANALYSES OF SELECTED SE DEVELOPMENT PROGRAMS

ANALYSIS OF SELECTED ONGOING PROGRAMS

Jet Air Start Units (JASU)

Jet Air Start Units (JASU) was one ongoing program that has been subjected to the GSEARB discipline. The current program commenced in 1977 with a survey of six fleet units and thirty USN and USMC activities to assess the capabilities of then existing pneumatic start equipment. The survey collected data on systems inventory, operational status, condition, mode of operation, frequency of use, problem areas and maintenance. As a result of the survey NAEC published three reports between March and May of 1978 which were assessments of existing mobile JASU, centralized air start systems (CASS) aboard aircraft carriers and CASS and stationary air start systems, (SASS), aboard shore facilities of the U.S. Navy and U.S. Marine Corps. Concurrently, in March 1978, NAEC published a report on the operational need for pneumatic start equipment for a twenty-five year period commencing in 1977, for peacetime and combat operations. These assessments demonstrated that while the requirements for air start equipment will decline due to the continuing introduction of self-starting aircraft, replacement air start units would be required as a result of extended service life of existing equipment, obsolescence and attendant repair part procurement problems and increasing unreliability and maintenance requirements. In June 1978, NAEC completed and issued an economic analysis of pneumatic start equipment options which priced the various options to meet the operational need:

- Procure no new equipment and meet operational needs through upgrade and Service Life Extension Programs (SLEP) of existing assets.

- Replace selected equipments with new procurement state of the art JASU.

- Replace all existing JASU with new state of the art JASU with first delivery in the 4th quarter of FY84.

This analysis demonstrated that selection of last two options could result in life cycle cost savings of as high as $4.2M and $12.5M respectively whereas the selection of options 3 had some probability of costing $5.3M over selection of option 2. In February 1979 NAEC published a report addressing pneumatic start equipment alternative selection which analyzed the relative probability of success and evaluated the possible benefits of the alternatives, including subsets of alternatives 2 and 3. This analysis addressed the following success factors;

- Manpower availability
- Facilities availability
- Contractor/vendor problems
- Technical risk
- Long term supportability
- Configuration management

and the possible benefits of:

- Performance
- Fuel (energy) consumption
- Maintainability
- Reliability
- Overhaul life
- Configuration management

The report recommended the selection of alternative 3 and the following month, March 1979, NAEC submitted a recommended acquisition and life cycle plan.

Based on the overall analysis effort and recommendations GSEARB I approved the plan and authorized the commencement of development of a new JASU. The project master plan for the A/S47A-X jet air start unit was submitted in March 1980 and in July 1980, GSEARB II approved full scale development. A procurement contract for prototype engines were executed in the 4th QTR FY80. GSEARB III is tentatively scheduled for October 1982 and the program is on schedule.

TF41 TLA/TRIM Test Set

The TF41 TLA/TRIM Test Set was the second equipment acquisition selected for management analysis. The TF41TLA/TRIM Test Set was designated the A/E24M-30 during the developmental process. The test set is used to make adjustments to the Temperature Limiting Amplifier (TLA) and to verify that the TLA is performing satisfactorily as an accessory for the Detroit Diesel Allison (DDA) Division of General Motors Corporation, TF41 jet engine used in the A-7E aircraft. It is also used to conduct engine trim runs and troubleshoot the engine.

The development was initiated as a result of an action chit originated at the TF41/ILSMT meeting held at DDA in July 1976. The requirement for a new test set was based on a long history of unreliability of test sets and associated cabling then in service use, substantiated by Unsatisfactory Condition/Material Reports (UR's) and recommendations of fleet units. The new procurement test set was planned to replace four (4) Engine Limiter Test Sets of varying configurations then in use. The action chit was assigned to NAVAIR for action.

The test set development and acquisition was designated for development under the GSEARB review process even though it was PSE for the TF41

engine. Conceptual development was commenced and GSEARB I was held on 17 December 1976. (A chronological list of documentation in support of the GSEARB process is contained in the Attachment). GSEARB I selected and approved an alternative which assigned development to Naval Avionics Facility, Indianapolis, (NAC) under the engineering supervision of NAEC. Delivery of first production units was projected for approximately January 1980 and GSEARB II was tentatively scheduled for April 1977.

On 26 July 1977, GSEARD II was held and the preliminary Program Element Master Plan (PEMP) was approved in part. During this and subsequent meetings through 31 August 1977 a milestone plan was developed which compressed full scale development by approximately four to six months and established projected completion dates for TECHEVAL, OT&E (FLEET), IFB release and ASU completion. Projected production contract reward was established as Jan 79. On 27 Jul 1977 NAEC was requested to proceed promptly with full scale development.

Preliminary GSEARB III was conducted in Jan 79. Based upon successful aircraft compatability tests, GSEARB III authorized material procurement for prototype production and follow on production. On 15 May 1979 NAC submitted GSERD on the test set to NAEC. NAC estimated $2M development costs and until price of $18K for the test set based upon procurement of 100 units.

GSEARB III was conducted in Jul 80. Based on the interim TECHEVAL report and the final PACFLT evaluation report ASU was certified. The final review of the ILSP was completed and the ILSP approved.

Delivery commenced in Oct 1980 and the program is on schedule for final delivery in May 1981. The cost per unit is $17,500 against $18,000 estimated by the May 1979 GSERD.

ATTACHMENT TO APPENDIX C

CHRONOLOGICAL LIST OF DOCUMENTATION IN 30
SUPPORT OF TF41 TLA/TRIM TEST SET, A/E 24M)
DEVELOPMENT, ACQUISITION AND GSEARB REVIEW PROCESS

DATE	TITLE	ORIGINATOR
8 Dec 76	Mission Analysis for TF41/TLA/TRIM Test Set	Naval Air Engineering Center (NAEC)
8 Dec 76	Reliability and Maintainability Plan for TF41/TLA/TRIM Test Set	NAEC
13 Dec 76	Integrated Logistics Support Requirements Outline for TF41/TLA/TRIM Test Set	NAEC
30 Dec 76	TF41 Engine Limiter Test System, State-of-the-Art (Solid State), (Report of GSEARB I).	NAVAIR (AIR 534)
23 Feb 77	Performance Specification for TF41/TLA/TRIM Test Set	NAEC
12 Sep 77	TF41 Engine Limiter Amplifier (TLA) Test System, Full-Scale Development Program	NAVAIR (AIR 534)
1 Nov 77	Preliminary Electromatic Interference Control Program Plan for TF41/TLA/TRIM Test System	NAC
1 Jun 78	Revised Preliminary Hazard Analysis for TLA/TRIM Test Set A/E 24M-30	NAC
Sep 78	Level of Repair Analysis for Temperature Limiter Amplifier-TRIM Test Set A/E 24M-30 for TF41 Engine	NAC
11 Oct 78	ILSP for TF41 TLA/TRIM Test Set A/E 24M-30	NAVAIR (AIR-417)
22 Nov 78	Test and Evaluation Plan for TF41/TLA/TRIM Test Set A/E 24M-30	NAEC
5 Dec 78	Reliability Analysis Report for Test Set Temperature Limiter Amplifier/TRIM A/E 24M-30	NAC
23 Jan 79	Maintainability Program Plan for Temperature Limiter Amplifier/TRIM A/E 24M-30	NAC

DATE	TITLE	ORIGINATOR
2 Jul 79	Maintainability Prediction Report for Test Set, Temperature Limiter Amplifier TRIM A/E 24M-30	NAC
3 Jul 79	Allison Model TF41 Engine GSERDS	NAEC
18 Jul 79	Failure Modes Effects Analysis Report for Test Set, Temperature Limiter Amplifier/TRIM A/E 24M-30	NAC
7 Mar 80	Maintenance Plan for A/E 24M-30; MAINTENANCE PLAN PGSE-0260:AA 7 March 1980	NAC
8 Apr 80	Calibration Procedure for Test Set, Temperature Limiter Amplifier-Trim	NAC
9 Apr 80	Calibration/Measurements Requirements Summary for A/E 24M-30	NAC
15 Apr 80	Electromagnetic Vulnerability (EMV) Tests of TF41 Trim Test Set Serial 001	Naval Surface Weapons Center
1 May 80	TECHEVAL of Prototype Model TF41 Temperature Limiter Amplifier Trim Test Set A/E 24M-30, First Interim Report	NATC
9 Jun 80	PACFLT Evaluation TF41 TLA/TRIM Test Set	COMLATWINGPAC
2 Jul 80	Final Report for Reliability Qualification Test of Temperature Limiter Amplifier-TRIM Test Set A/E 24M-30	NAC
8 Aug 80	Environmental Evaluation Test of Temperature Limiter Amplifier-TRIM Test Set A/E 24M-30, Final Report	NAC
21 Aug 80	Electromagnetic Vulnerability (EMV) Test of TF41 TRIM Test Set (A/E 24M-30) Serial No. 0004 report of	Naval Surface Weapons Center
20 Oct 80	TECHEVAL of Prototype Model TF41 Temperature Limiter Amplifier TRIM Test Set, A/E 24M-30; Final Report	NATC

APPENDIX D

CURRENT CSE (RDT&E CATEGORY 6.4) DEVELOPMENT PROJECTS

PROGRAM ELEMENT (PRE) 64215N

LINE ITEM:	A/C HANDLING AND SERVICING EQUIPMENT	
PROJECTS:	SATS Weapon Loader	A/C Weapon Hoist (2nd gen)
	AHE Test Stand	AERO-21D Weapon Skid
	Shipboard Weapon Loader	USMC Hoist/Transp. System
	Small Missile Adapter	Gaseous Nitrogen Generator
	Small A/C Handler (ENMOD)	Mobile Electric Power Plant
	A/C Hydraulic Comp T/S	Shipboard Radiographic Film Processor
	Jet A/C Ground Start Unit	A/E 37T-26 Data Acquisition System
	Mobile Turbofan/Jet Engine T/S	A/E37T-24 Adapter Assy.
	A/S32A-32 Spotting Dolly	TA-10 Tow Tractor
	Eddy Current Probe Spec.	
LINE ITEM:	A/C SALVAGE AND HANDLING EQUIPMENT	
PROJECT:	ASHE Crane	
	ASHE Ancillary Equipment	
LINE ITEM:	AVIATION ATE	
PROJECT:	Consolidated Support System (CSS)	
	Propulsion ATE Diagnostics	
	Digital Automatic Test Program Generation (ATPG)	
	Existing Family of Testers	
	CSS Model	

APPENDIX E

SUPPORT EQUIPMENT RECOMMENDATION DATA (SERD)

The formats and instruction for completion of the SERD are contained in the Data Item Description (DID) UDI-E-21001E, "Data Recommendation Ground Support Equipment". Part I of SERD Figure 1a (Figure E-1) contains a Functional Analysis which provides a precise description, in technical terms of the function requiring support. Part II of SERD Figure 1a, Recommended Solution, gives the proposal for the equipment required to satisfy the functional requirement.

The SERD is a required submission from a weapon system contractor for each SE item which the contractor recommends for the weapon system. The contractor submits all of Figure 1a of the SERD. Figure 1b of the SERD contains data submitted by both the contractor and the Navy. (The SERD is also required for internal use within the Navy, to propose a new use for an existing SE item or to propose a new SE item for specific uses. In this situation, which is usually applied to a CSE item, the Navy provides all of the data.)

To foster standardization through the maximum utilization of SE already in use within DoD, the DID provides for the following.

"Selection and description of items shall conform to the following requirements:

1. To promote maximum standardization of GSE within the Government, the contractor shall consider the following order of priority in preparing recommendations:

   FIRST: Equipment defined by current Government specification, or modification of such equipment.

   SECOND: Off-the-shelf commercial equipment currently in the Government inventory for which procurement data are available.

FIGURE E-1. SERD FIGURE 1a

GROUND SUPPORT EQUIPMENT RECOMMENDATION DATA

CONTRACTOR:

CONTRACT NO. _____

END ARTICLE IDENT. _____

GSE PART/MODEL NO. _____

FIG. 1a PAGE NO. _____

REVISION NO. _____

DATE _____

PART I

FUNCTIONAL ANALYSIS

PART II

RECOMMENDED SOLUTION

ITEM NO.	ITEM NAME

THIRD: Other off-the-shelf commercial or modified commercial equipment.

FOURTH: Equipment to be developed by the contractor, subcontractor, or associate contractor."

The contractor is required to use the Technical Information File (MIL-HDBK-300) and the Standard General Purpose Electronic Test Equipment File (MIL-STEP-1364) to determine if an item already in the Government inventory can serve the purpose. He also must give first consideration, among available items, to those on the preferred SE lists (NAVAIR 16-1-525, NAVAIR 19-1-127). These lists are substantially made up of CSE items and, for this reason, do not offer any opportunity to select a PSE item already in the inventory. The Engineering Data Retrieval System (EDRS) is a computerized file containing the characteristics of all significant SE existing in the military services, including PSE. This file is identified for use in AR-21 but is not currently a contractural requirement. To overcome this deficiency, the EDRS is used by NAEC in the SERD review process. It is also being used by the contractor for the F-18 on the basis of an agreement made after the weapons system contract was concluded. Use of the EDRS will be made mandatory when a new MIL-STD 2097 is issued to replace AR-21.

The second part of the SERD, Figure 1b (Figures E-2 and E-3) contains detailed information concerning item identification, cataloging, logistics support data, and procurement and allowance data. The procurement information includes the estimated date of availability of the first article if the item requires development, production leadtime, development cost, estimated unit cost, the total recommended buy quantity (block 41) and the recommended maximum number of end items supportable by a stated quantity of SE items (block 39). These data are all provided by the proposer. In addition to the above data, the proposer recommends specific authorizations of the SE items, by

FIGURE E-2. SERD FIGURE 1b (1 of 2)

GROUND SUPPORT EQUIPMENT RECOMMENDATION DATA

SHEET 1 OF 2

1. CONTRACTOR		2. CONTRACT NO.		3. END ARTICLE NOMENCLATURE/MODEL DESIGNATION			
4. GSE ITEM NAME				5. STATUS CODE (G)		6. RESPONSIBLE AGENCY (G)	
7. SYSTEM NO. (G)	8. DEV/STANDARD	9. COMMON/PECULIAR	10. USING SERVICE	11. E I. SPEC (G)	12. CFE.GFE	13. FEDERAL STANDARD S (G)	
14. GSEI (G)	15. LSA (G)	16. PRE-POSITION CODE	17. USABLE ON CODE	18. TECH MANUAL (PGSE ONLY)	19. RRPL/GAPL (G)	20. MRC (PGSE ONLY)	
21. MATCH INDICATOR CODE (PGSE ONLY)	22. SPARE FACTOR (G)	23. CALIB REQUIRED (PGSE ONLY)	24. CALIBRATION ITEM	25. SMR CODE (G)		26. INSTALLATION SIG.	
27. ARTICLE REQUIRING SUPPORT						28. GSE CRITICAL	
27a. ML/MC	27b. PART NUMBER AND NOMENCLATURE			27c. CMRS		CONTR	SERVICE
					ENGR		
					PROC		
30. REASON FOR DELETION/SUPERSEDURE DATA				30a. TYPE EQUIP. CODE (G)		29. ENGINEERING DATA (G)	
31. REMARKS							
32. DATE OF APPROVAL	33. ITEM NO.	33a. PART/MODEL NO.	33b. FSMC	33c. DATE	33d. REVISION	33e. PAGE NO.	

FIGURE E-3. SERD FIGURE 1b (2 of 2)

GROUND SUPPORT EQUIPMENT RECOMMENDATION DATA

SHEET 2 OF 2

1. CONTRACTOR	2. CONTRACT NO.	3. END ARTICLE NOMENCLATURE/MODEL DESIGNATION

4. GSE ITEM NAME	34. NATIONAL STOCK NUMBER					35. GOVT. TYPE DESIGNATION
	IMC	FSC	NCB	NIIN	M/IMC	

36. EST. DATE 1ST ARTICLE (PDSE ONLY)	37. PROD LEAD TIME (PDSE ONLY)	38. DEVEL COST (PDSE ONLY)	39. REC QTY FACTOR	40. RECUR UNIT PRICE (PDSE ONLY)	41. TOTAL REC QTY	42. TOTAL QTY ORD (G)	43. TOTAL PRICE (G)

44. SPECIFIC AUTHORIZATION

ACTIVITY	QUANTITY	ACTIVITY	QUANTITY	ACTIVITY	QUANTITY
CONTRACTOR					
TRAINING		TEST SITE		DEPOT	
				OTHER	
		SRA			
		I/RAN			

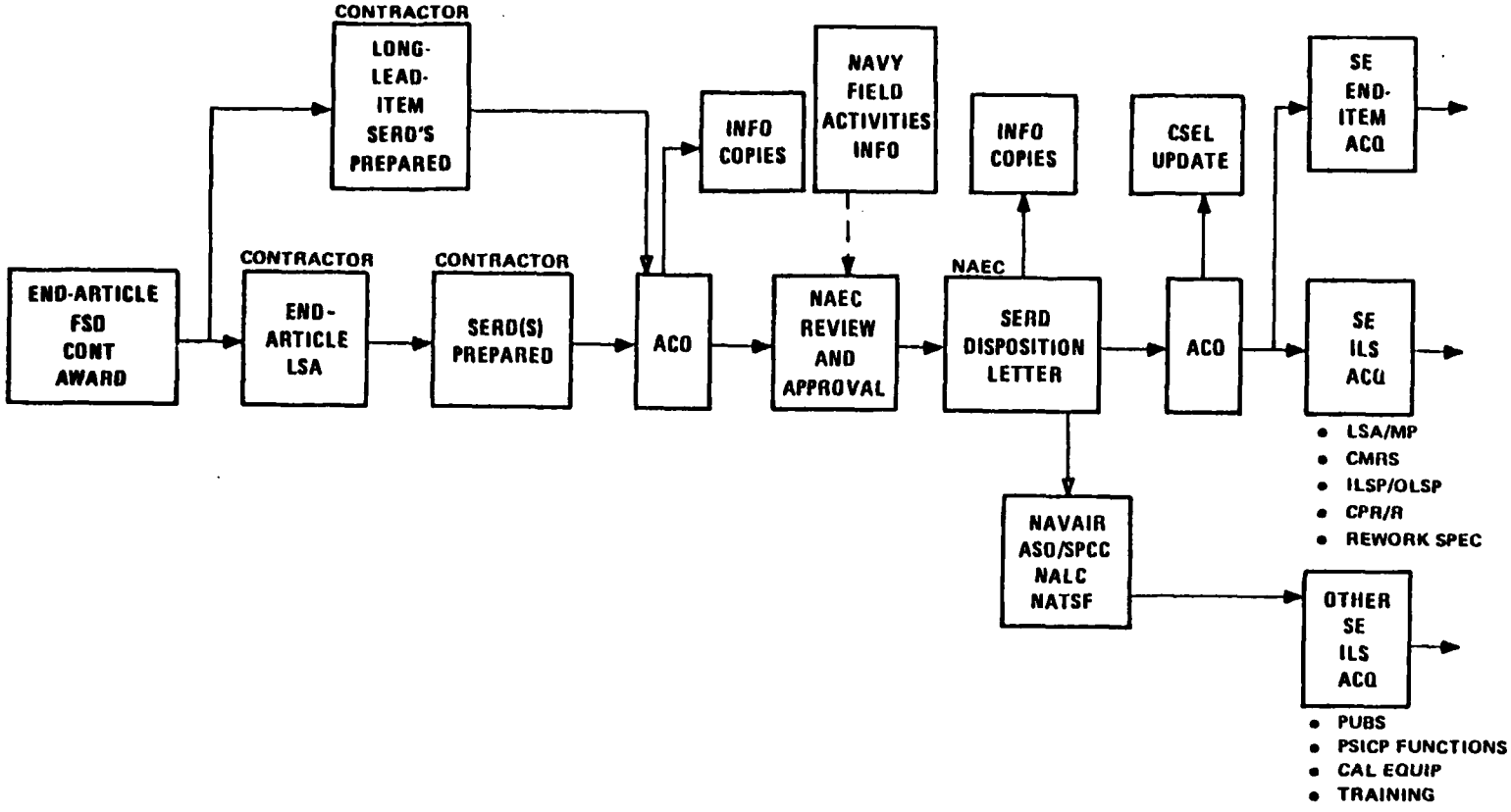
45. ALLOWANCE, MLF (G)	46. BASIS OF ISSUE (G)												47. SUPERSEDED ITEM (PART NUMBER)	48	31. REMARKS (CONT)
	1–4	5–8	9–12	13–16	17–24	25–32	33–64	65–128	129–250	251–450		EXT RNG			

33. ITEM NO.	33a. PART/MODEL NO.	33b. FSMC	33c. DATE	33d. REVISION	33e. PAGE NO.

activity, for activities whose allowances are not derived from blocks 45 and 46. In blocks 45 and 46, normally government furnished, are entered the "Allowance/Maintenance Level Function" which identifies the level of maintenance and the "Basis of issue" which indicates the quantities of end items allowed for support of the range of end articles shown in the column headings. The information in the second part of Figure 1b contains important data pertinent to the POM/budget/ procurement process. It provides leadtime data and estimated costs which can be used for timing and costing in the budget and procurement processes. It also provides a recommended total buy quantity (block 41) and a basis for allowance and total inventory objective computation.

The contractor submits his SERD proposals through the ACO to NAEC which usually acts as the approval authority on behalf of AIR-552 and AIR-417. Figure E-4 is a flow chart depicting the SERD preparation, review and approval cycle.

FIGURE E-4. SERD PREPARATION, REVIEW, AND APPROVAL CYCLE



APPENDIX F

SUPPORT EQUIPMENT POM/BUDGET FORMATS

FIGURE F-1

PGSE REQUIREMENTS SUMMARY SHEET

** CURRENT FY $ **

$ AMOUNTS BY FICAL YEAR:

	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88
REQUIRED RECURRING COST:										
REQUIRED NON-RECURRING :										
TOTAL REQUIRED:										
TOTAL DIRECTED:										
DATE DIR.										
SURPLUS/DEFICIT:										
REQUIRED RECURRING COST:										
REQUIRED NON-RECURRING :										
TOTAL REQUIRED:										
TOTAL DIRECTED:										
DATE DIR.										
SURPLUS/DEFICIT:										
REQUIRED RECURRING COST:										
REQUIRED NON-RECURRING :										
TOTAL REQUIRED:										
TOTAL DIRECTED:										
DATE Dir.										
SURPLUS/DEFICIT:										
REQUIRED RECURRING COST:										
REQUIRED NON-RECURRING :										
TOTAL REQUIRED:										
TOTAL DIRECTED:										
SURPLUS/DEFICIT:										

FIGURE F-2

AIR-534/417
BUDGET FORM
REV SEP 1977

GSE BUDGET PLANNING SUMMARY

SHEET 1 OF 3

ITEM NOMENCLATURE	FUNCTION	DATE PREPARED	DATE REVISED

SECTION I BACKGROUND/FUNCTIONAL REQUIREMENT ANALYSIS/APPLICATION

SECTION II DESCRIPTIVE INFORMATION/CHARACTERISTICS

SERVICE LIFE

RELIABILITY

MAINTAINABILITY

SECTION III DEVELOPMENT HISTORY/STATUS

1. PHASE		FY/COST	FUNDING (TYPE)	PERIOD
EXPLORATORY DEV	FY			
	$			
ADVANCED DEV	FY			
	$			
ENGINEERING DEV	FY			
	$			

2. APPROVAL FOR SERVICE USE (ASU) DATE _____
IF ITEM HAS NOT BEEN APPROVED FOR SERVICE USE, COMPLETE AND ATTACH NAVMAT FORM 7310/7

3. TECHNICAL EVALUATION

ACTIVITY	DATE(S)

RESULTS

4. DOCUMENTATION TO BE USED IN PROCUREMENT

a. EQUIPMENT/DESIGN SPECIFICATIONS

(1) TYPE — DETAIL DESIGN (DWGS) SPECIFICATION ☐
PERFORMANCE SPECIFICATION ☐

(2) IDENTIFICATION

(3) STATUS

(4) VALIDATED ☐
VERIFIED ☐ BY WHOM

(5) ANY SPECIFICATION CHANGES REQUIRED PRIOR TO NEXT PROCUREMENT? YES ☐ NO ☐

(6) ARE CURRENT AND VALID SPECS AVAILABLE? YES ☐ NO ☐ IF NOT, WHEN? _____

b. CONTRACT TYPE (IF OPTIONS ARE PLANNED OR IF MULTIYEAR, GIVE DETAILS)

5. ENGINEERING/DESIGN PROBLEMS

6. LOGISTIC SUPPORT PROBLEMS

FIGURE F-3

AIR 534/417
BUDGET FORM
REV SEP 1977

GSE BUDGET REQUIREMENT SUMMARY

SHEET 2 OF 3

ITEM NOMENCLATURE	UNIT COST (BASIS FOR COST ESTIMATE)	DATE PREPARED	DATE REVISED

PROCUREMENT LEAD TIME (MONTHS)

TOTAL (INITIAL)	ADMIN (INITIAL)	PRODUCTION (INITIAL)	TOTAL (REORDER)	ADMIN (REORDER)	PRODUCTION (REORDER)	TOTAL (OPTION)	ADMIN (OPTION)	PRODUCTION (OPTION)

CURRENT AND FORECAST REQUIREMENTS (END OF CY UNLESS NOTED)

ELEMENTS OF INVENTORY		CY	CY	CY	CY	CY	CY	CY
INVENTORY OBJECTIVE	1.							
	2.							
	3. MARF [N] TRAINING [T] CONTR [C] OTHER [O]							
	4. TOTAL INVENTORY OBJECTIVE							
INVENTORY STATUS	5. CURRENT ON HAND (FROM ALL SOURCES) FY- AND PRIOR PROCUREMENT							
	6. ON CONTRACT (DELIVERED OR BEING DELIVERED) FY- (APN-)							
	FY- (APN-)							
	FY- (APN-)							
	7. TOTAL ASSETS							
	8. TOTAL LOSSES							
	9. NET ASSETS (LINE 7-8)							
	10. NET REQUIREMENTS (LINE 4-9)							

PROCUREMENT PLAN

PROCUREMENT		QUANTITY	NEW CONTR, OPTION, OR MULTIYEAR						
FY-	(APN-)								
FY-	(APN-)								
FY-	(APN-)								
FY-	(APN-)								
FY-	(APN-)								
FY-	(APN-)								
FY-	(APN-)								
FY-	(APN-)								

REMARKS

ALLOWANCE

UNIT ALLOWANCES	I / O	1-4	5-8	9-12	13-16	17-24	25-32	33-64	65-128	129-256	257-460	

DESCRIPTIVE RATIONALE FOR ALLOWANCE

NOTE: FOR SPECIAL ALLOWANCES THAT DO NOT FIT 10 COLUMN SPREAD, ATTACH SEPARATE SHEET WITH EXPLANATION

END

DATE
FILMED
10-81

DTIC